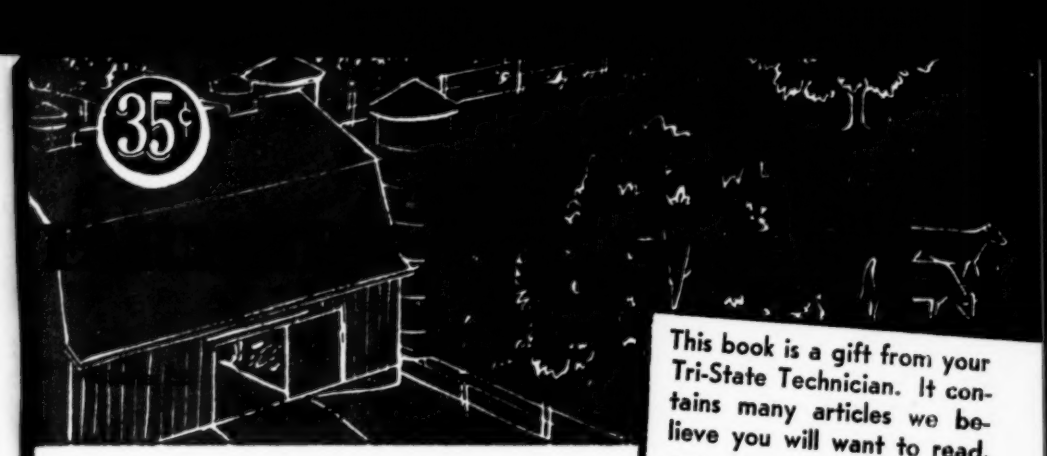

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TRI-STATE BREEDERS CO-OP
Westby, Wisconsin

DAIRY ANNUAL 1958 - 1959

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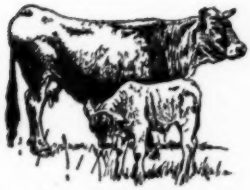
Fort Atkinson 21, Wisconsin

The Farmer's Digest

Volume 22 October, 1958 Number 4

Milk Fever in the Calving Cow



Often the first perceptible symptom of milk fever is a slight paddling of the rear feet. Here's what to do about it . . .

Condensed from Farmer and Stock-Breeder

MILK FEVER is, in almost all cases, the result of a straightforward calcium deficiency. There are some cases which are complicated by an accompanying magnesium or phosphorus deficiency, or all three together, but there are few compared with the number of simple calcium deficiency cases. The condition can occur immediately before, during, immediately after or even some considerable time after calving, but it is invariably mixed up with the acts of giving birth and secreting milk.

As far as I know it is unknown in the first-calf heifer. I certainly have never seen such a case. It is rare in second calvers, and is most common in cows bearing their third or later calf.

The reason for this is fairly obvious. The mineral calcium is the one responsible for the building up of the skeleton of the calf growing in the uterus; and, as is well known, milk is rich in calcium too. So at third calving the cow's calcium reserves have been called upon to produce two previous calves, two previous lactations and now with her third calf she comes into or nearer maximum milk production.

The drain on calcium is enormous and it is no small wonder that milk fever develops.

There are, of course, unknown individual factors in each cow which determine whether or not she will go down with milk fever. How else can we explain the fact that the condition will develop in

Reprinted by permission from Farmer and Stock-Breeder, Dorset House, Stamford Street, London, S.E. 1

one animal and yet not occur in similar animals of the same age.

The symptoms of milk fever are almost the same in every case, and it depends entirely at which stage the animal is first seen as to which symptoms are noticed.

First Symptoms

There is a very short period of increased excitement. The animal appears restless, gazing round rapidly from side to side, and "paddles" with the hind feet. This is a rapidly transient stage and is followed by the progressively comatose condition with which all dairy farmers are familiar: a drowsy appearance of the eyes, cessation of cudding and feeding, swaying of the hind quarters.

If forced to walk the cow does so very unsteadily and drunkenly. She will fall down, but may rise again with a great struggle. Within a very short time she is down again and this time she stays down in a perfectly normal lying position. Soon she becomes very sleepy and adopts the text book position of the cow with milk fever—slightly over on her side, head turned round with muzzle in her flank.

If left untreated she will roll over on to her right side, the rumen will become distended with gases, and death from asphyxia will result from the pressure of the distended rumen on the diaphragm.

TO PREVENT MILK FEVER

1. Feed well throughout pregnancy, making sure that your feed is balanced and sufficiently rich in vitamins and minerals.
2. Ensure a dry period between calvings.
3. Do not extract much milk from heavy milkers by hand, machine or calf for 48 hours after calving.
4. In the U.S., feeding of Vitamin D concentrate has been tried with some success. (In tests at the Ohio Station, 48 mature Jerseys with previous histories of milk fever were used. No milk fever symptoms were observed in 14 cows fed 20 to 30 million units of Vitamin D per day for five to seven days before calving. One cow out of 12 fed 10 million units per day had an attack. In the check group, fourteen of 22 untreated control cows had milk fever.)

One feature of milk fever is that the temperature is invariably sub-normal—it is not a "fever" in any sense of the word.

Calcium is the mineral responsible for the control of the "neuro-muscular mechanism"—delicate mechanism through which muscles respond instantly to stimuli received from the nerves. Once this mechanism is upset the cow loses all power of co-ordination and muscular control.

Drench Danger

That is why, in milk fever, the cow cannot swallow properly and why it is so dangerous to drench a milk fever case—choking will invariably follow. That is why there is a complete cessation of dunging and urination. That is why contraction of the uterus stops and a cow goes down with milk fever with the calf half delivered. That is why death results from paralysis of the breathing muscles.

What are the immediate "first aid" steps to be taken on finding a case of milk fever? First and foremost get your veterinary surgeon on the way.

While he is coming there are many things which you can be doing to help the cow. If she is flat out, put on a rope halter and with help pull her up into as near a normal lying position as you can. Roll her right over on to her other side and prop her up with straw bales. Never tie a case of milk fever with a chain—you can always put your knife through a rope!

Cover her up with rags or sacks and if you have any embrocation give her back a good 5-10 minute rubbing with it to warm her up. Keep her propped up whatever you do—it will prevent her from becoming blown.

The treatment of milk fever is based on the injection of calcium. This may be given alone in the form of calcium borogluconate or some veterinary surgeons prefer mixtures of minerals in the same injection.

It is given subcutaneously (under the skin) or intravenously (in a vein), the rapidity of response to treatment depending upon the route by which the injection is given. With subcutaneous injection, absorption is slow but excretion of calcium is slow too, and therefore it may take three or four hours before the animal is upon her feet. But the effect of the calcium will be fairly prolonged.

Here are illustrated typical attitudes of a cow which has gone off her legs with milk fever: left, the head turned with the muzzle in the flank; and right, on the side in the preliminary stages of blowing.

With intravenous injection the result is spectacular but the effect may wear off quickly and the cow go down again. That is why a dose by both routes is given in many cases—for a rapid result and prolonged action.

Complications

The vast majority of cases of milk fever are completely better in about four to six hours after treatment, but there are complications of this disease which can retard recovery and which in some cases have fatal consequences: for example, injuries to the pelvis, hips and spine on going down, congestion of the lungs and inhalation pneumonia from the cow inhaling its own saliva when flat out, retention of faeces in the bowel leading to marked enteritis and later to peritonitis.

These are the more serious complications which you can help to avoid by your first aid treatment.

You may ask, why not give the cow an injection of calcium before she calves to prevent milk fever? Unfortunately this does not have the effect you would imagine. Calcium has a threshold value in the blood stream and the calcium content cannot be raised above a certain level, for if this is done it is immediately excreted until the normal level is attained again. So if you inject a cow immediately before calving her blood calcium may be absolutely normal and your calcium is quite worthless.

There can, however, be no doubt at all that with heavy milkers, at their third calving or after, a bottle of calcium given immediately after calving could do nothing but good.

Artificially Sired Heifers Bring High Prices

In North Carolina, the fifth annual series of Proved Sire Bred Heifer Sales set a new record for both the quality of animals offered and the average selling price.

A total of 152 animals, all the result of artificial breeding to proved sires, sold for an average of $309. This is $24 above the average paid in 1957 and is the highest since the sales began in 1952.

According to T. C. Blalock, in charge of dairy extension at N. C. State College, particularly noticeable at this year's sales was the increase in the size of the animals and the quality of their udders.

A larger percentage of the heifers were the second and third generations of artificial breeding, accounting for some of this improvement, Blalock said. "Certainly," he added, "the quality of cattle exhibited in the sales offers a strong endorsement of the artificial breeding program. —*North Carolina State College*

Testing for Butterfat is Tricky Business

If you can't understand why your DHIA test doesn't compare with that of your milk plant, read this article . . .

Condensed from Wisconsin Agriculturist

SHOULD your DHIA average test be higher or lower than your milk plant test? If there is a difference who is right and who is wrong?

Your cows may be responsible for the variation.

"Many Wisconsin dairymen believe that a DHIA monthly average should coincide with the test received at the factory during the same period," says Leslie Peckham, manager of the Jefferson County (Wisconsin) Dairy Herd Improvement Association. "There are many reasons why the two butterfat tests may vary."

"Any creamery, cheese factory or any company who buys milk will check the butterfat percentage twice a month, or in some cases twice a week. A sample is saved from each day's milk for 15 days for a composite sample. The plant result for the month is made up by analyzing these composite samples.

"On the other hand, the DHIA average test for the month is based on one day's supply, which represents the average fat content of all the milk produced on the farm on testing day."

As far as the 15 day period is concerned, Peckham explains, the factory tests would be more apt to be correct, but this is not the whole story.

Many Variables Given

The real explanation goes back to the individual cow. Cows vary in feedings the same as human beings, depending upon appetite and quality of roughage and grain.

Any change in feeding and management may be sufficient to upset a cow. These factors have a great influence on milk composition from milking to milking and day to day.

In a few cases, Peckham says, the time between milkings is longer on DHIA testing day. This

Reprinted by permission from Wisconsin Agriculturist, Racine, Wisconsin

would result in a greater volume of milk but a lower butterfat content.

Also, cows are more likely to be milked out more completely when the DHIA supervisor is taking samples. Cows that are about to be turned dry are often milked until the supervisor makes his monthly test. Milk from fresh cows is not included in the DHIA test when the cow has freshened within seven days of his visit.

When cows go off feed because of sickness, the milk yield and fat content are affected. "Cows coming down with milk fever," Peckham says, "have a tendency to yield a higher butterfat test in the first stages of the disease but have a lower than average test when they resume production."

Temperature Affects Test

Temperature also has a direct influence on the butterfat test. Following sudden changes in temperature, a variation in fat may be expected.

Excitement caused by barking dogs, sore teats or beating cows during milking will cause cows to hold up their milk. This results in a lower milk yield as well as a lower fat content in the milk.

The DHIA supervisor does not always test the same milk that is delivered to the plant, although he has an individual sample from each cow. A portion of the milk may be spilled, used at home or fed to calves.

Mistakes are possible in testing procedures, either in DHIA or milk plant laboratories but they are not likely. Most variations are caused by day to day fluctuation in fat content by individual cows.

Is this a good time to go into the beef cattle business?

Probably not. In fact, it may be about the worst. There's a good chance that cattle prices will be near present levels most of the time for the next 3 years. If this happens, however, prices are almost sure to start a steep slide by about 1961. A man starting with a breeding herd now wouldn't have many cattle to sell by then.— State College of Washington.

"If you do have a question," says Peckham, "don't hesitate to bring your problems to a DHIA supervisor or fieldman. The dairy farmer should work closely with his DHIA supervisor to eliminate factors that cause excessive fat variations."

"Remember, however, that you are not testing to check on the milk plant, but rather to weed and cull out the boarders in your herd.

"If you must make a comparison with the milk plant, make it over a period of one year and see if the DHIA herd test and the plant test do not compare favorably for the 12-month period."

So You Think You Know Cows

Doctor W. E. Peterson of the University of Minnesota talks "cow psychology" with Ralph Foster, Capper's Farmer associate editor . . .

Condensed from Capper's Farmer

Question. Doctor Peterson, a successful dairyman said not long ago that you have to know a lot of cow psychology to be a good dairyman. Do you agree?

Answer. I certainly do. You can find every counterpart of human behavior in cows. And they respond to all kinds of treatment —good or bad.

Q. They really recognize what is good or bad?

A. I am sure they do. When you or I go into a dairy herd, we can pretty well tell the kind of treatment they are getting by their reaction to us. If they have been treated well, they will show confidence in us. If they have been mistreated, they will show fright and distrust by attempting to get away.

Q. Then it takes a little flattery or a pat on the back to get the most out of a cow?

A. Handling of a dairy cow differs in many details from caring for other livestock.

You come in intimate contact with a cow twice a day when you milk her. When we understand the fundamentals of milk letdown we know why some milkers get good results and why others fail with the same cows in the same barn.

This ability to keep the cow producing at her best I like to call good cowmanship.

Q. What are some of the marks of good cowmanship?

A. They are hard to catalog. We have tried to write a score card on the characteristics of the

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individual that determine how the cow responds to him.

We have failed so far because we can't see the milker thru the eyes of the cow. We have to let the cow's response score her milker on cowmanship.

Children thank Santa for filling their stocking at Christmas. Do you thank God for filling yours every morning?

Q. You mean the cow's answer to whether or not she likes her milker is in the milk pail?

A. Yes. She answers by the measure of her milk let-down. Some cows just won't let down all their milk. They hold back some. We call that "complimentary milk." We can measure it by injecting a hormone immediately after the normal milking period and putting on the milker again.

There are several reasons for "complimentary milk." One is that the cow inherits this characteristic. Generally she dries up prematurely.

Another reason for poor let-down or high "complimentary milk" is that the cow won't respond to her milker. If he is a poor cowman, she holds back part of her milk. And the more she holds back the faster she dries off.

Q. Then one mark of good cowmanship is the ability to tell when a cow isn't doing her best?

A. Yes. I remember a little prima donna in our herd a number of years ago. She made a good record her first year in our test barn with a man of proved good cowmanship. Later when she was put in our regular string, and milked twice a day by other milkers, she dried up rapidly.

Her milk weight might vary as much as 10 per cent from one milking to another. In other words she let down her milk completely only when she felt like it.

Later we put this cow in another experiment where an outstanding cowman milked her. Every time he milked her she let down her milk completely. In this particular lactation she gave 60 per cent more milk than in previous lactations. That increase can be credited to the know-how of the cowman.

Q. She was complimenting the milker she liked by giving him more milk?

A. Yes, she was responding in the best way she knew. We tested this cow in two weekly intervals by giving her another milker. Each time she went back to her previous habit of refusing to let down all her milk.

Q. Couldn't you compare the milking procedure of the milkers

in this test to tell why one was good and the others bad?

A. There was nothing we could point to definitely. All followed the same procedure. They washed her udder the same way, put the teat cups on the same way, and stripped her out the same way.

But there was something about all but one that she didn't like or wouldn't accept. I pride myself on being a good milker, but I couldn't make this cow do her best.

Our experience with this cow illustrates the peculiarities that all cows have in some degree and which this cow had to a high degree.

Q. You say this variation in milk letdown hastens the drying off of a cow?

A. Yes, and that brings us to a real fundamental of high milk production. The important objective in milking is to get all the milk. It must all come out at each milking. Otherwise that which is left in the udder builds up pressure which sets off the drying process.

The best way to dry off a cow is not to milk her at all. The next best way is to let a poor cowman milk her. It may take him a little longer, but he will get the job done.

Q. Then a good cowman stimulates the cow to do her best all the time?

A. Yes, he makes her want to work for him. Actually the milker is substituting for the calf. The mother cow wants to give milk to her calf. It is what psychologists call psychosomatic response.

The good cowman is able to make the cow want to work for him instead of against him. And I must say I have seen herds where I rather admired the cows for wanting to work against their handlers rather than for them.

Q. You say you can't write a score card for cowmanship. How then would you describe a good cowman?

A. One measure of a real cowman is that his herd likes to associate with human beings. When you visit the herd of a good cowman his cows will welcome you although you are a stranger. They like to come up and inspect you rather than run from you. They show that their handler gives them comfort rather than abuse.

Q. But to go back to this prima donna cow. She wasn't actually abused by the man for whom she refused to let down her milk?

A. No, you couldn't say he abused her. But cows know when they are loved. And I am sure they have a sense that tells them when they are resented by their handler.

Q. I know an Ohio dairyman who says you have to love cows to be a successful dairyman.

A. He's right. Unfortunately there are some men who can never learn the fundamentals of good cowmanship, largely I believe because they hate cows. If the milker has that attitude, his cows are going to detect it quickly. I can tell you a story that emphasizes this fact.

It's a case where a good Minnesota dairy herd dropped almost a third in production. I was asked to find the reason because this father and son hadn't been able to put their fingers on it.

The son had made a fine record in his 4-H dairy projects. He had done an excellent job with the dairy and milking chores while his father took care of field work. Then suddenly this slump in milk output had come.

I checked the feeding program. It was good. I looked at the breeding records. Nothing in particular was wrong there. The milking equipment was satisfactory. But the DHIA records showed a big milk drop.

So I talked with the son in my search for the reason. I found he was just graduating from high school and was getting ready to go to college. "Good." I said. "I'll have a chance to get better acquainted with you then."

"No," he replied, "I am not going to study agriculture. I am planning to be an engineer."

After a little more conversation, I sensed the reason for the milk slump. I said, "You don't like cows anymore." Without a moment's hesitation he came back, "I hate them."

When the cows sensed that dislike they refused to respond with their best.

Q. So a poor cowman doesn't have to beat a cow for her to know that he dislikes her?

A. No. The resentment becomes mutual. The cow attempts to reject her milker rather than to co-operate with him.

Q. What are some of the major offenses of the poor cowman?

A. There are many. Kicking, yelling, and use of a fork to keep her back from her feed are good ways to offend the cow. Striking her legs when attaching the milker and backing her across the gutter too fast are others. All these evidences of bad temper set up a strained relationship between the cow and her milker.

Q. Has the development of the milking parlor intensified this situation?

A. In some instances it has. In others I am sure parlors have improved the relationship.

In many instances it is a more comfortable method of handling and milking the cows. And the adoption of the parlor and its good equipment oftentimes de-

velop pride and interest on the part of the dairyman who is handling the cows. He is stimulated to do an all-around better job.

Q. How much does routine play in getting good response from a cow?

A. It plays a pretty big part. Cows form habits quickly. They like to go to pasture the same time every day. They lie down from grazing about the same time of day. They get up to graze at the same time. They want to be fed and milked at the same time in the evening. If you are late in feeding they get nervous and start bellowing.

Q. A dairyman could love his cows and still be a poor feeder could he not?

A. Yes, that's hard to believe, but we see it often. The owner will do a good job of housekeeping in his dairy barn and take good care of the udders, then turn his cows out in summertime on a poor pasture. Likewise he will chuck straw or poor hay in front of the stanchions and expect the cows to make milk out of it.

The dairy chain requires a lot of strong links, and the whole business is no stronger than its weakest link. I know of a 100-cow herd where a change of managers meant an increase of 1,000 pounds of milk a day.

Q. That would be about $40 a day by Minnesota prices would it not?

A. On the better Grade A markets it would, yes.

Q. Would you say a good cowman could have mastitis in his herd?

A. I don't think he could have much mastitis for long and still be classed as a good cowman.

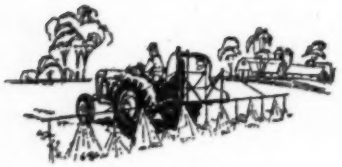
Cows get mastitis for a lot of reasons. They can get it in stanchions that are too short for them. They can get it in pastures filled with brush and brambles, and in lots with broken wire, boards, and mudholes. They can get it from improperly adjusted milking machines and from leaving the milker on too long.

A man still might love his cows and show all these signs of neglect. But I couldn't call him a good cowman.

Bee-Repelling Insecticide

A new compound which repels bees for from 8 to 48 hours after a field has been sprayed with a deadly insecticide is being tested in Oklahoma. If the new repellent continues to prove successful, researchers believe it will be valuable in saving bees from freshly-treated fields and will be useful on crops that depend on good pollination for proper seed development.

Easier Pasture Renovation



Here's a cheaper, faster way to get good pasture. It works — even on fields too steep and rough for conventional renovation . . .

Condensed from Successful Farming

PLOWING up or discing old pasture sods is out of date. Chemicals now do a better job of killing the sod — and do it with *less labor*. This means you can put new pastures on old hillsides that are too rocky to plow; it means you can make pasture seedings on steep slopes and they will not wash away!

Richard Cole, Port Jervis, New Jersey, established a pasture on 20 per cent slope with chemicals. The basic program he followed will work for dairymen in most parts of the country, because there are several possible variations built on it. Cole's basic steps were:

1. Test the soil.
2. Graze the pasture down close.
3. Spread all lime called for by the soil test.
4. Spray pasture with chemical mixture containing 4 pounds dalapon, plus 1 pound of aminotriazole, per acre.
5. Apply fertilizer called for by soil test.
6. Disc the pasture twice at right angles to each other.
7. Seed in the dead mulch.

(Beauty of this system is already evident. A seedbed prepared with only 2 discings!)

STEPS TO BETTER PASTURE

1. Spray Herbicide.

Get soil samples tested; put on lime. Graze the pasture down short. Spray carefully, get complete coverage. You have choice of several different times that you can spray and seed.

2. Disc Dead Sod.

Chemical spray kills the sod. It now takes 2, sometimes 3 trips with the disc to prepare the seedbed. Make these trips at right angles to each other. Fertilizer is disced in here.

3. Seed New Cover.

Seed right after discing. Do this at the time most favorable for the seeding. You can put in small grains, and follow with the pasture mix; or seed pasture mix alone, depending on your needs.

When you do these steps depends on what you're after. In New Jersey, dairyman Cole has an intensive pasture program. He

Reprinted by permission from Successful Farming, Des Moines 3, Iowa

needs all the pasture he can get. Therefore, he sprayed in August. He seeded rye on September 10 to get early fall and early spring pasture. The rye was grazed lightly in November.

The pasture mix of Ladino, alfalfa, and brome was top-seeded March 30. The rye was clipped in July. A new seeding was ready to graze in August.

America produces enough milk annually to fill a river 3,286 miles long, 40 feet wide and 3 feet deep.

However, the whole program can be stepped up or turned back to suit most areas in the country. The chemical can be applied at several other times for different seeding dates. Apply August 1 to 15 for September seeding.

Apply July 15 to 25 for a late August seeding.

Apply April 15 to 25 for a late May seeding.

Apply in October for an early spring seeding.

Many farmers now find band seeding in pure stands superior to broadcast seedings in companion crops. In Ohio, for example, chemical pasture renovation is working best by applying 5 to 10 pounds of actual dalapon late in the fall. On good soils, trefoil is band seeded at 6 pounds per acre by early April. No companion crop is used.

In all seasons, it is important to clear all brush and movable obstructions from the pasture. This enables complete coverage of chemical and ensures a good kill. The less top growth remaining on the pasture when it is sprayed means it takes just that much less chemical to do a good killing job. Fertilizer is generally bulk-spread the day before the discing operations, just prior to seeding.

The disced sod mulch serves an excellent purpose in affording protection for the new seeding and in controlling erosion. Hurricane Connie dumped 6½ inches of rain onto a chemically renovated pasture in New Jersey. There was no erosion on slopes of 20 per cent!

A five-year food preference study among army men rated milk as the favorite food, ranking it ahead of the much-talked-of steak and fried chicken.

Dr. M. A. Sprague, research specialist at Rutger's University, has carried on extensive research with chemical renovation. Here are the actual yields of dry forage per acre in two pasture comparisons. With conventional disc renovation—which included 11 discings, 5,024 pounds per acre. The next year, conventional disc renovation produced 5,256 lbs. per acre. Chemical renovation

with two discings produced 5,719 pounds dry matter per acre.

The cost of the chemical renovation will run about $8 to $10 per acre for chemicals. This is about half of what it will cost to do the job with conventional equipment. Reducing the number of discings required means that seedings can be made on time. Because chemicals give a better kill of the old weedy sod, the new seeding will last longer.

New chemicals will improve on this method. Right now, one called Cacodylic acid looks even better than the dalapon-aminotriazole application. It has done an excellent job at 10 to 12 lbs. per acre in single applications. Because it has no residue, 2 lbs per acre can be applied the same day as seeding is made, to control weeds growing from seed. Forage seedlings are not affected.

Now, it's *easy* to renovate a pasture. Your weed sprayer is your new renovation tool. It will work for you only if used along with a good soil test and the lime and fertilizer the soil test calls for.

Six Million Dairy Cows Now Bred Artificially

The number of dairy cows bred artificially from sires that have demonstrated superior breeding qualities keeps rising each year. Now more than a fourth of U.S. dairy cows are so bred.

A roundup by the U.S. Department of Agriculture of reports submitted by State Extension dairymen show that over 6 million U.S. dairy cows were bred artificially in 1957. In numbers, Wisconsin was the leading State with over a million artificially bred cows. Minnesota followed with over half a million, and then came New York and Pennsylvania with a little less than half a million each.

Percentagewise, States with far fewer dairy cows made an even better showing. Maine ranked first, then Utah and Massachusetts. Nearly 50 per cent of the cows bred in these States during 1957 were bred artificially.

Sires used for artificial breeding are proved on the basis of their ability to pass along to their daughters a capacity for high milk production. The proved sires used in artificial studs in 1956 were mated to dams that averaged 10,626 pounds of milk. Their daughters averaged 11,304 pounds of milk.

— West Virginia University

You Can't Afford Beef Cows

In 68 Indiana beef herds, average loss was $17 per cow. In Minnesota, each calf raised lacked $11.88 of paying its mother's keep . . .

Condensed from
National Livestock Producer

Roger Mittelberg

GRASSLAND acreage is increasing throughout the Midwest as the result of the Soil Bank, conservation and land reclamation programs. Much of this grass is being harvested by beef cow herds and each fall thousands of calves from these herds are offered for sale.

In Iowa, for example, the number of beef cow herds is up 29% over the 10-year average. Other Corn Belt states have shown similar increases in the number of farmers participating in the cow and calf enterprise.

Program Looks Profitable

These farmers should ask themselves—Can I afford a beef cow herd in the Corn Belt? Judging from the number of farmers engaged in a cow and calf program year after year, it looks like a consistently profitable operation.

But looks can be deceiving! A study of commercial beef herds on 68 Indiana farms revealed that less than half of these enterprises made a profit. The study showed an average loss of $17 per cow during the year. A study of 15 typical cow and calf programs in Minnesota showed that each calf lacked $11.88 of paying for the cow's keep, to say nothing of the labor involved.

Your returns from grazing land must be determined by the amount and value of beef produced. That's true of the cow and calf program, or if you buy your own steers.

With the cow herd, let's start with a unit of twenty 1,000-pound beef cows and one bull for a total of 21,000 pounds of foundation beef stock. In one year's time, the most you can produce is 20 weaner calves with an average weight of 400 pounds. So you finish the year with a total of 29,000 pounds of beef—a gain of 8,000 pounds.

With the steer purchase plan, you must start with a unit of thirty 600-pound stockers which

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will give you a foundation beef herd of 18,000 pounds. Thirty steers are used for comparison because it takes about the same amount of grass to maintain 100 pounds of foundation beef—whether it is in the form of cow or steer. A unit of 30 steers will consume about the same amount of grass as 20 cows, their calves and one bull.

In one year's time, these 30 steers can be expected to gain 400 pounds each, or a total of 12,000 pounds. That gives you 30,000 pounds of beef with the steers—or 4,000 pounds more beef produced from the same amount of feed used by the cows and calves. Actually, the difference may be a little more, because a 100% calf crop is most unusual. With an 80% calf crop you would get 6,400 pounds of beef increase from the cows as compared with 12,000 pounds of beef from the steers. In this example, the steers produced 87% more beef.

Some live stock producers may question the steer purchase plan because it involves yearly buying and selling—two separate and speculative operations where you might lose money.

If the cattle you have for sale are fatter and have more finish than the stockers or feeders you purchased, they will usually sell a little higher than the purchase price. That has been the experience of many cattlemen whose statistics indicate that you, too, should average out over a period of years. The returns per $100 worth of feed fed to purchased feeder cattle amounted to $153 in 1957 among farmers keeping Illinois Farm Bureau Management records. The 25-year average is $124.

5-Year Results of Steers-on-Grass

Starting Year	Weight Initial Costs	Time on Farm	Gain	Selling Weight Selling Prices
1953	572 lbs.			940 lbs.
	$22.50	340 days	408 lbs.	$22.00
1954	665 lbs.			1,085 lbs.
	$18.50	350 days	420 lbs.	$20.25
1955	702 lbs			1,172 lbs.
	$17.90	331 days	470 lbs.	$22.50
1956*	746 lbs			1,083 lbs.
	$18.00	315 days	337 lbs.	$22.50
1957	787 lbs.			
	$23.00	Not completed		Not Sold

* Three steers didn't do well, looked like hardware trouble.

Steers on a grassland farm in Missouri gained an average 2.1 pounds per head per day on grass and hay. In Central Illinois, Clarence Cunningham has obtained an average daily gain of 1.25 pounds per steer per day. The average covers 12 months from market purchase weight to market selling weight, as steers were roughed through the winter months to gain very little.

Steers Gained 409 Pounds

Cunningham's actual buying and selling prices for steers from 1953 to 1957 are shown in the accompanying table. During the past four years, his steers have put on an average 409 pounds in an average 334-day grazing period. His steers were not fed grain but in 1955-56-57 a protein block was self-fed to steers on pasture. Average consumption was .4 pound per steer daily.

Cunningham's cattle usually sold at a little higher price than what he paid for replacements although transactions were made at about the same time each year. His cattle are not grain-fed, but those he sells are always fatter than those he buys, since he adds about 400 pounds per steer.

Figures prior to 1953 shown in the following table are average stocker and feeder prices at Chicago in September of each year. They should reflect generally what could have been done with a steer purchase grass program over the years. These figures do not reflect price differences due to finish.

Purchase Price Per Cwt.		Selling Price Per Cwt.	
1956	$18.00	1957	$22.00
1955	17.90	1956	22.50
1954	18.50	1955	20.25
1953	22.50	1954	22.00
1952	26.50	1953	22.50
1951	34.00	1952	26.50
1950	28.25	1951	34.00
1949	22.00	1950	28.25
1948	24.75	1949	22.00
1947	20.85	1948	24.75
1946	16.25	1947	20.85
1945	12.60	1946	16.25
1944	12.00	1945	12.60
1943	13.15	1944	12.00
1942	12.25	1943	13.15
1941	10.65	1942	12.25
1940	9.40	1941	10.65
1939	8.85	1940	9.40
1938	7.95	1939	8.85
1937	8.65	1938	7.95
1936	6.05	1937	8.65
1935	8.00	1936	6.05

The table shows the September stocker and feeder prices from 1935 to 1957. The overall increase during this period was $10 per cwt., or about 50 cents per cwt. per year. During this period there were some years when purchased steers were not profitable, but the same was true of the cow herd. Calves sometimes sell a little higher per cwt. than yearlings, but the extra gain on yearlings should make up this slight difference.

The comparisons shown here are for a strict grass program. If you feed grain on grass, or can judge cattle shrewdly in both

buying and selling, you can do much better than the table reflects.

For a successful grass steer program in Illinois and other Corn Belt States, pasture should be good enough for cattle to make continuous gains. Steers don't have to gain much during the winter period. They can be brought through the winter on limited rations, bounce back on pasture, and be in good shape for sale in the fall.

Actual pasture gains on Cunningham's cattle for 5½ months in 1956 were better than 2 pounds per head per day. A good fly control program, asserts Cunningham, increased the rate of gain by ½ pound per head per day.

With a cow herd, it is necessary to keep heifers which involves separate lots and pastures. The bull must be kept away from the herd for certain periods of the year. In general the cow herd means more work and usually less profit. Considering labor, equipment, pasture, profits, and other factors the steer purchase program usually produces more beef per acre.

The steer program is not an alternative for the cattle feeder who buys a large number of cattle for feeding on grain. It may be an alternative for the beef cow herd operator because it is geared to utilizing pasture, small grain, or corn field clean up programs. If it is adaptable to your operation, you may find it more profitable than a cow and calf program, especially in the Corn Belt.

Do the Best Cows Make Most Money?

Many dairymen claim the best cows are the most profitable cows, but it's hard to prove the point. Now the farm economics branch of Ontario's department of agriculture has produced figures on the subject.

They took 1955-56 DHIA reports and matched cow values with production and cost of a cwt of milk. Here's what they found out:

For cows worth less than $155, producing around 7,300 lbs. milk, costs were $3.12 per cwt.

For cows worth $214 or more, producing around 8,900 lbs. milk, costs were $2.69 per cwt.

That's a cost difference of $1.81 per cwt. or a cost of around 25 per cent. *—Farmer's Magazine, Canada*

You Should Think About Labor-Saving

With thirty cows, you probably lift, throw or carry four tons every day . . .

Condensed from

Vermont Farm and Home Science

E. C. Schneider, Agricultural Engineer

HOW much work are you doing?

You may be surprised to learn that, as a dairy farmer with 30 milking cows, you may pick up, throw, or carry about four tons a day. So, if you can cut down on the amount of lifting and carrying, handling and rehandling of materials, you can save a lot of time, energy, and health.

Of course, modern methods on dairy farms have already cut down on the needed labor. Take, for instance, the water pump. A family of five people plus a herd of 30 milkers will use about 1,250 gallons of water a day. With a hand pump you would have to pump and carry five tons or about 600 pails of water a day. Obviously, the electric water pump and distribution pipes do this job much more efficiently.

But in a stanchion barn with 30 milkers, you handle over 1,400 tons a year in your feeding, milking, and manure removal operations. Without a pipeline milker or bulk tank you must lift 120 tons of milk at least four times or more. Including your field operations, you pick up each bale of hay and bedding about six times. As you handle 80 tons of hay and bedding for each of your cows in a year—not to mention silage, grain, and manure—your load-lifting quickly mounts up.

Some items of equipment that reduce this handling to a minimum are gutter cleaners, conveyors, elevators, blowers, bulk grain bins with gravity feed, bale loaders, field choppers, and silo unloaders.

In our Vermont Agricultural Engineering Department we are

Reprinted from Vermont Farm and Home Science, Vermont Agricultural Experiment Station, Burlington, Vermont

doing research to help improve this materials handling picture. We have designed, built, and tested a conveyor feeding system for dairy cows in stanchion barns. It consists of a manger conveyor and a supply conveyor.

The system is controlled by a timer motor which operates a series of switches. For example, if the farmer wishes to feed silage, he pushes a button which starts the cycle. A silo unloader delivers the right amount of silage to the supply conveyor which carries it to the manger conveyor. An electric fence prevents the cows from eating the silage as it goes by. When the silage reaches the last cow every thing stops. Then the electric fence cow trainer moves out of the way automatically so that the cows can eat. Any silage left in the manger is swept into the pit the next time the conveyor is used. The manger conveyor returns in the back wall of the manger.

If the farmer wants to feed hay, the process is the same except he pitches hay down the chute until signaled by a bell to stop. We are doing work that we hope will eliminate this pitching, making the operation as automatic as the silage feeding.

Feeding with this system can save 58 per cent of the time and 77 per cent of the travel needed for hand feeding, besides the saving in energy. The cost of electricity to operate the system is less than 25 cents per month. When the silo unloader is used, the cost of electricity is somewhat greater.

When all is said and done, there's generally more said than done.

Can you justify buying such equipment? There are many things to consider when mechanizing for materials handling. It costs money, as shown by the great increases over the past decade in farmers' investments in farm equipment. These investments should be justified.

Some of them may be justified by reasons of health. For instance, a farmer with a heart condition, arthritis, other infirmities, or just plain advanced age cannot do as much as a younger man. Thus mechanical aids for materials handling in the field and around the buildings may make it possible for him to continue farming.

The shortage of reliable farm labor also may justify such equipment. Increased quality of the product, such as hay or milk, also may make it wise to buy.

When considering the purchase of equipment, however, be sure the size of your operation is large enough and that you will use the equipment enough hours during the year so it will pay for itself.

Milk Check Without Milking

Here's a new angle for small dairymen: Turn your cows and chores over to a cow boarding house . . .

Condensed from Farm Journal

Dean Wolf

CARROLL MORRIS, an energetic young farmer, may have really started something this month when he began operating Fashion Farm in Cerro Gordo County, Iowa.

It's a new kind of dairy farm which, when completed, will house, bed, feed and milk 800 cows for 56 other dairymen. It's the first big-scale boarding house for cows in the Midwest — the first in the country to take over *complete management* of the herds.

And if the idea spreads, it could shake up the dairy business everywhere. It could be the small dairyman's answer to bigness; it could be the Grade B producer's route into Grade A; it could be the Midwest's version of the huge "cow towns" that have sprung up in California.

Versions of the "cow pool" idea have been around for some time. Five years ago, Farm Journal told about Utah farmers who were driving their cows to a central milking parlor. Others have kept their cows on one farm but come in to do the chores. At the big Walker-Gordon farms in New Jersey, some owners are responsible for care of their own cows, and the farm does the milking and milk-selling.

Fashion Farm does everything. Besides, it opens up a Grade A milk market to 54 farmers who were selling Grade B before. (The other two were already on Grade A.) It's a *premium market* paying around 60 cents per cwt. *more after hauling* than the local Grade A market. And these dairymen don't have to invest a dime in Grade A housing and equipment.

No wonder some dairy experts are excited about it.

Farmers sign up their cows for three years. They pay $30 per cow per year to cover housing and equipment costs, and Fashion Farm's profit. They pay for the grain mix fed according to production, and for hay according to how much their cows weigh. All other costs—labor, bedding,

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veterinary service, electricity, heat, milk hauling and the like — are totalled up each month and pro-rated per cow.

At this point Morris estimates they'll run something like this: Labor, $42 per cow per month; bedding, $6; veterinary care, $3; electricity and heat, $6; milk hauling, $.47 per cwt.

The owner delivers his cows or pays Fashion Farm to do it. No cows are accepted with horns. Each must be tested for TB, brucellosis and leptospirosis, and have a clean bill of health from a veterinarian.

Morris mixes up the herds, groups the cows according to production and breed—100 cows per pen. He'll get production records with some cows; will have to wait and see how others produce.

Morris buys all feed and bedding, charges it back at cost. Cows get hay and grain mix in drylot the year around. He beds with corncobs which cost $2 per ton spread in the lots.

It's a loose housing set-up just like you find on 40-cow farms, only 20 times bigger. Cows are housed in a 52'x896' pole barn. Baled hay is stored and fed in four 30'x96' haykeepers, each holding 250 tons. A 48'x60' milking parlor has overhead grain storage and two 8-stall diagonal Surge milking units. The milk is piped to two 1,725 gallon bulk cooling tanks.

How will they keep track of individual herd test where all the cows are mixed together?

Morris is paying farmers on the basis of monthly DHIA tests on their cows. College studies show that these production figures don't vary significantly over the complete lactation. The records are tabulated on Iowa State College's IBM machine.

Morris' tank trucks haul the milk to Borden's plant in Kansas City where he gets the going Federal Order price, plus a 15 cent premium for bulk handling. Hauling costs him 47 cents per cwt. For example on the basis of the June published price his net after hauling figured out at $3.86 per cwt.

At the same time, farmers selling locally in Cerro Gordo County, Iowa were getting only $2.75 for Grade B and $3.25 for Grade A, after hauling costs.

With a 61 cent to $1.11 price incentive, it's not surprising that farmers signed up their cows even before Morris had his barn built. "I have 20 farmers on my waiting list now," says Morris.

"It looks like the only way to stay in the dairy business with present Grade B prices," says A. B. Brouwer who entered 20 cows. "Some farmers here have been

on the Grade A waiting list for three years."

Dairymen figure they'll net as much per cow by boarding them out as they were keeping them at home—*without having to do the chores.*

It's just the ticket for tenants like Andy Ramacker who doesn't have facilities on his farm to expand his 10-cow herd or to pass Grade A inspection. "The day's coming when you can't sell anything but Grade A milk," he told me. "That means get big and efficient. The only way I can do it is to board out my cows."

Older farmers see a lot of possibilities. Irvin Slattum figures: "I'm not interested in investing in a Grade A setup now and then retire in a few years. This way I get a milk check from my 10 cows without doing the hard work." And Slattum can keep his milk check coming after he retires, just like rent.

Farmers short of labor, like Adrian De Waard, gladly turn the chores over to Fashion Farm. Farming 340 acres with part-time help, he tells me: "Something had to go, but golly I hated to sell my 30 cows averaging 512 lbs. of butterfat a year. Now, I can keep them and farm as much as ever."

It's a way to get bigger for some. Lloyd Erwin figures: "I'll net as much from my 30 cows as before, won't need much hay or pasture so I can grow more corn, and I'll have time to feed cattle or raise hogs." And if it works out, he'll increase the size of his dairy herd kept at Fashion Farm.

Wheat grows in every one of our 48 states, occupies more farm acres than any other single crop and is harvested somewhere in the world every month of the year.

For the most part, *farmers with good cows* have gone for the idea. Four herds are in the 500-pound butterfat class. About 20% were on DHIA test. Morris is shooting for a 450-pound average—quite a goal on 800 cows.

He has a good herdsman with eight years of experience handling an 800-cow herd in California. He'll feed according to production per lot. No doubt farmers will cull poor-paying cows in a hurry. And all will be bred to good bulls by artificial insemination.

When a cow dries up, the owner takes her home until she freshens. And he raises the calves.

The boarding house idea could catch on fast. There are lots of dairymen in the same boat as the Iowans were in before they boarded out their cows. They'd welcome a chance to get Grade A prices without having to invest in Grade A facilities, or con-

tinue to get the same milk check without having to do the chores.

Morris has inquiries from New York, Ohio, Illinois and Wisconsin asking for details. He's planning to expand to 1,200 cows next August when the marketing year starts.

Roadside sign—"You can eat our apples in the dark."

There are advantages gained with size — enough probably to offset the disadvantage of not using family labor and homegrown feed. Morris gets a 20% discount on volume purchases of feed. It's easier to get and hold a market.

He pays only 4 cents more per cwt. to haul milk 305 miles to Kansas City than some local dairymen pay to haul 30 miles to Mason City, Iowa. The reason: His truck makes one stop, loads up and takes off. The local route man has to make 25 to 30 stops at scattered farms to pick up the same volume.

Processors are interested in getting milk from big drylot dairy farms. Volume runs about the same throughout the year. Quality is uniform with cows fed the same hay-grain ration the year around. It simplifies quality control and cuts inspection costs.

Dairy farmers have mixed feelings about it. Some Grade A milk producers will feel the effect if much Grade B milk can climb aboard their market via the boarding house idea.

But as Curtis Peterson, who boards out his 20 cows, explains: "No more milking cows and I still get as big a milk check every month. It may not be good for the country, but you can't stop people from thinking up new ideas and putting them to work."

New Ways of Selling Milk

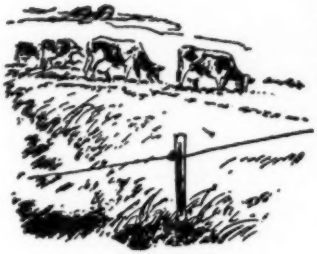
There has been an increasing awareness during recent years of the need to seek new ways of using milk.

Workers at Kansas Agricultural Experimental Station have described three new products. These are Dairy Crisp Crackers, Dairy sandwich spread, and Dairy frying crispies.

German research workers claim to have produced a sparkling carbonated sour milk product. From Switzerland comes news of a non-alcoholic whey beverage which forms a good foam, is golden brown in color and is claimed to have met with considerable success on the Swiss soft drink market.

—South African Dairyman

Which Pasture System for You?



Take your choice of strip-grazing, green-chopping or storage feeding. Here are advantages of each . . .

Condensed from
Michigan Farm Economics

C. R. Hoglund and *C. M. Harrison*

IF YOUR dairy farm needs more summer feed, or if you wish you had more forage left for winter use, then you may want to consider a different way to produce and use green forage during the pasture period.

Three methods now being used are strip-grazing, green-chopping, and storage feeding.

Farmers' experience and research results show that a strip-grazing system can increase carrying capacity over well-managed continuous grazing by 15 to 20 per cent. Green-chopping and storage-feeding can increase carrying capacity by 25 to 35 per cent.

Which Method for You?

Consider your labor force and seasonal labor needs when you decide which of the different pasture systems is best for your farm. Strip-grazing and forage-feeding need little labor and usually do not conflict badly with labor used in growing and harvesting crops.

Using the green-chopping method takes from 30 to 90 minutes daily to chop and haul forages for a herd of 30 or more cows. You must decide whether or not this time spent would cut in on your other work enough to lower your net income.

A paved dairy barnyard not only licks the winter mud problem, but helps save feed and manure and prevents disease.

The location of your summer forage is also important in choosing a pasture system. A strip-grazing operation must have water and be near buildings. If you strip-graze, you must move fence and observe grazing at least once a day.

Green-chopping and storage-feeding are more suitable if the forage supply is across a busy

Reprinted from Michigan Farm Economics, Michigan State University, East Lansing, Michigan

highway or railroad, or is away from buildings and water supply.

An important problem in green-chopping is keeping enough (but not too much) succulent forage ready for chopping during the entire summer season. Many farmers grow a fast-growing crop such as Sudan grass to fill in the mid-summer gap when the second crop of alfalfa-brome grass is small or the first cutting would be too old if left for chopping.

Pelleting improves the feeding efficiency of low-quality roughage more than it does high-quality roughage.

Steady Supply Is Important

Harvesting a few acres of alfalfa-brome grass early for silage or hay often helps to give you a steady supply of this forage crop during the season.

Harvesting forage crops early and putting them into storage for summer feeding has both advantages and disadvantages over the other two systems mentioned.

One advantage over the green-chopping system is that harvesting operations are finished at one time. You may be able to get uniformly good forage for the whole season.

A strip-grazing system is especially good for farms with herds of less than 30 cows. Operators of these farms often find it does not pay to invest in extra equipment for green-chopping.

"There is hardly anything in the world that somebody cannot make a little worse and sell a little cheaper, and the people who consider price only are this person's lawful prey."
John Ruskin

Storage-feeding is likely to be most economical on farms now using a loose-housing system with mechanical silage feeding equipment or self-feeding bunker silos.

Consider All Factors

Before adopting a new system, consider carefully the changes that may occur in: (1) labor, fence, and machinery needs, (2) forage expenses, and (3) net income.

Here's a summary of points to remember when you decide whether or not to use an alternative summer forage system:

1. **If you're short on labor, you may want to stick with your present method or try strip-grazing.**
2. **If your pasture is not nearby, you may want to consider storage-feeding or green-chopping.**
3. **If you have less than 30 cows, investing in new equipment for green-chopping would probably not be profitable.**

How To Get High Quality Roughage

It's still the number one problem for dairymen . . .

Condensed from Prairie Farmer

Jim Lilly

HIGH-quality roughage is still the number-one problem facing most dairymen. Biggest help in roughage improvement in recent years has been the increased use of grass and grass-legume silages.

However, grass silage is not the answer for a lot of dairymen in the Midwest. Some farmers don't like to feed grass silage, others aren't equipped to handle it, and some don't have the necessary capital to get started with silage.

Also, it may not be economical for many small herd operators. For these dairymen, hay is still the big forage crop and probably will continue to be for a number of years.

As a result, good roughage, particularly hay is very important in the dairy herd's ration. It means more money in your pocket and less spent for supplement.

C. R. Hoglund, Michigan State University agricultural economist, says that on farms using excellent-quality roughages, the feed cost of producing milk averages $1.62 per hundred. Where poor-quality roughages are used, this jumps to $2.08, just 46 cents more for producing 100 pounds of milk.

The big saving with good-quality roughage comes with feeding less protein supplement and grain to cows. High-quality roughage has protein and total digestible nutrients (TDN) that low-quality roughage lacks. More TDN per pound means less grain has to be fed.

It's pretty difficult to tell exactly when you have high-quality roughage, but here are a few rules you can follow:

1. Early-harvested forages have the most protein and are gener-

Reprinted by permission from Prairie Farmer, 1230 Washington Blvd., Chicago 7, Illinois

ally of the highest quality. For your alfalfa-brome combinations, this means harvesting when the alfalfa is in the early-bloom stage. Even then, your brome-grass has started to slip in quality since it matures at least a week earlier than alfalfa.

Alfalfa hay harvested in the early-bloom stage, even rain-damaged, has a higher feeding value than green hay harvested in the full-bloom stage.

2. The more legume in your hay crop, the higher-quality roughage you can have.

3. Crushing or crimping and barn drying take a lot of risk out of hay-making, especially for the first crop when weather is a critical factor.

Michigan State University agricultural engineers conducted some hay-crushing tests in 1948 and 1949. They found that the crushed hay dried in 30 to 50-per cent less time than the uncrushed hay. Here are the figures: (They are for southern Michigan, and you should reduce them a little for areas farther south.)

Hours of sunshine required to cure hay to safe storage moisture:

	Hours
Ordinary field-cured hay	20 to 25
Crushed or crimped and field cured	12 to 15
Partially cured, then barn dried	10 to 12

In one particular test, crushed hay mowed before noon one day was ready to bale the following afternoon. Uncrushed hay in the same field, cut at the same time, wasn't ready until the following day.

Barn Drying

Barn drying can cut a few more hours off the field-curing time. You start putting hay in the barn when it reaches 40-per cent moisture. To work at its best, barn-dried hay should be chopped. Machinery costs may outweigh the worth of this practice for you, however.

Another relatively new system involves using a heated-air dryer and special drying wagons. With these units, you bale your hay at the 40-per cent moisture level and then dry it right on the wagons. Using a crimper in conjunction with either a barn dryer or the wagon drying units will cut your field-curing time even more.

Both crushers and crimpers are pretty popular in haymaking areas right now. There haven't been many tests run to see which reduces moisture the most in a given time, but agricultural engineers are planning to start testing before long.

Tentatively, they say that crushers and crimpers take about the same time to get hay to a certain moisture level. If you mow and crush or crimp at the same time, you can figure that you will be slowed down over your normal mowing speed.

Either crusher or crimper will run your haying costs up a little. Economists figure that you will have an extra dollar a ton in your hay when you use either of these machines.

Purdue economists have also done some figuring on what it costs you to harvest, store, and feed hay. The feeding costs used in getting the total cost are based on putting the hay directly into feed bunks. If you load and haul the hay to feed it, you can add another dollar to the costs.

Cost Per Ton

For baled hay, they estimate that it costs you $6.59 per ton to harvest, store, and feed the hay in a one-story barn. For a 2-story barn, you can add another 20 cents.

With chopped hay in one-story barns, it will cost you $6.40 to harvest, store, and feed. In a 2-story barn, the costs are around $7.29 per ton.

Loose hay stacked outside has a total cost of $4 per ton for harvesting, storage, and feeding. The cost for storing loose hay in a one or 2-story barn is prohibitive on the basis of the charges the economists used in computing the total costs.

Weather during haymaking time has been a bugaboo for a long time. Improved forecasting has taken some of the risk out of weather, but be sure you keep a close eye on weather forecasts over the next 3 to 4-day period when you are ready to cut hay.

Most agronomists recommend that you cut hay after the dew has evaporated. They say to allow 2 to 4 hours for wilting and then rake the hay into medium-sized windrows.

Tests have shown that total drying time is not increased greatly by windrow-curing instead of swath-curing. You also cut leaf-shattering losses by raking when the hay is still "tough."

If it rains, tip the windrows up on edge with the end of the hay rake. Hay in windrows probably won't be damaged as much by rain as hay in the swath.

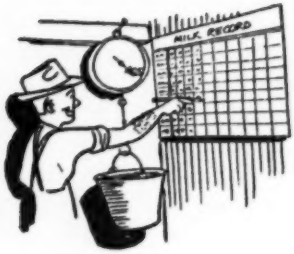
Don't Feed Silage Sprayed with DDT

Corn dusted or sprayed with DDT should not be made into silage and fed to dairy cattle.

Dr. R. P. Link of the University of Illinois College of Veterinary Medicine, says that it takes at least three months after application for the residual effect of DDT to be eliminated.

If the corn is made into silage before this time, cattle will store some of the insecticide in the fatty tissues of their bodies. They probably won't show any signs of poisoning, but they will give milk that is contaminated, warns Dr. Fink. —*Illinois Extension*

How Much is Fall Freshening Worth?



Calve cows in the fall to sell more milk when prices are highest, boost total output and ease chores in busy seasons . . .

Condensed from

Massey-Ferguson Farm Profit

THE cow freshening in the fall probably will return $50 more per year than if she freshened during the spring surplus period.

The fall-fresheners should produce 500 lbs. more milk than spring-fresheners and that milk will bring more money. The chart below shows how the income from a 30-cow herd producing at the 10,000-lb. level might be increased $1500 per year by making the shift.

"Better-than-average dairymen with good quality cows can make an extra $50 profit per cow by fall freshening," says E. E. Peterson, who studied 900 typical farms in the Detroit milkshed. An 8-year University of Kentucky survey showed that herds with most fall-fresheners averaged 26% higher income than same-sized herds with more spring-fresheners.

Good examples are Michigan farmers Carlyle Waltz and John Davis. They're grossing an extra $1200 to $1600 a year due to shifting from spring to fall freshening during the past 10 years. Waltz has 30 cows, Davis 50.

At the present rate of use, the average worker can keep his family supplied with butter for a whole year by less than 11 hours of work. Less than 20 years ago, it took 110 hours.

Here are reasons why fall-freshening may boost your milk income:

Higher average prices. Fall-freshened cows produce more of their milk when prices are normally higher and a smaller share in spring and summer when prices are as much as $1.00 per cwt. lower.

Reprinted by permission from Massey-Ferguson Farm Profit, 710 N. Plankington, Milwaukee 3

Income with 30-cow spring-freshening herd **$11,300**

Extra income for fall-freshening

Higher average prices for milk	$ 700
Bonus for building higher base	200
500 lbs. more milk per cow	600
	$1,500

$ 1,500

Income with fall-freshening herd **$12,800**

Waltz and Davis take real advantage of the spring-fall price differences. Contrary to what most dairymen get, Waltz' daily production on his Ingham County, Mich., herd last September-October-November was 70% greater than during the low-price period of May-June-July. In Eaton County, Davis' fall average more than doubled spring production.

At U.S. average prices, Waltz' annual output would average 25c a cwt. higher than for the same milk produced when he was on a spring-freshening system. Figured on his 1956 production of 348,200 lbs., that would be an extra $870.

Higher base. You get an extra bonus for fall-freshening if you sell under one of the federal milk marketing orders. In one way or another, each assures higher prices in fall than in spring.

Waltz ships under the Detroit base-surplus plan, in which the average daily milk sold in August through December is figured as the base. "Over-base" production during any month of the following year is considered "surplus" milk and is therefore lower-priced—often as much as $1 below "base milk" during late spring. His production pattern adds $200 to $300 to his annual milk check.

4,931 widows of northern Civil War veterans are still drawing pensions from the U.S. Government. The last veteran died during the summer of 1956.

Higher annual production. Peterson's study showed fall-freshening can increase production about 550 lbs. per cow. At $4.00, that would add about $660 to a 30-cow herd.

"Cows freshened in the fall get the extra boost of spring pastures," explains G. A. Williams of Purdue. "They're also affected less near the end of their lacta-

tion by late summer's hot weather, poorer pastures and insects."

Waltz' average production, now at 12,550 lbs., has jumped 2,000 lbs. during the past 10 years. Davis' average has gone up 30%. Some of the increase, of course, is due to better cows and feeding.

It's easier to prevent anemia in baby pigs than it is to cure it. Injectable iron dextran is one of the best treatments for preventing the condition.

Less work in busy seasons. "When our cows freshened in the spring," says Waltz, "we just didn't have the time to take care of them properly. Now our milking chores ease up about the same time we get busy in the fields."

How to make the shift. "Best way is to breed first-calf heifers for fall-freshening," says Peterson. "It may mean buying heifers to replace old cows." That's how Waltz and Davis shifted.

High quality feed is especially important in fall-freshening. You have to supplement fading pastures in late summer with more grain or top-notch silage. And you need good green roughage to bridge the winter pasture gap.

Adequate Storage Facilities Cited As Key to Corn Profit

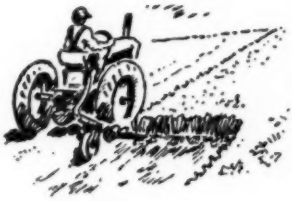
The construction of more and better storage facilities is the best way for farmers to take advantage of a bumper corn crop, says Everett Nichols, grain marketing specialist for the N. C. Agricultural Extension Service.

"A farmer has one of three choices," Nichols declared. "He can either sell his corn at harvest time, store it with or without a CCC loan or feed it to livestock."

If the farmer chooses to sell his corn immediately, he must take into consideration the lower prices at harvest time. A survey of corn prices from 1953 to 1957 shows that the rise from the harvest low to the market high some 8-10 months later has averaged 30 cents per bushel as it has done this year."

If the farmer accepts one of the two remaining choices — holding his corn for a higher market or feeding it to livestock — then storage in involved. —*North Carolina Extension*

You Can't Afford to Let the Hay Wait



If you delay cutting until July 1, it can cost you $170 per month . . .

Condensed from
Production Credit Association Farming

THERE'S a time of year when most farmers have a tough time deciding whether to make hay, chop silage or fight the weeds.

If you figure the hay can wait but the weeds can't, figure again. The loss of protein from your forage may be a great deal more than the damage done by weeds.

The kind of hay made on the average farm is only 47% digestible (total digestible nutrients). But alfalfa-brome cut before bloom may have 72% TDN. Young rye and legumes hit 78%. Cattle eat more of this good feed and get more out of it—a double gain.

Early cutting can be worth an extra $15 a ton or more to you. If average hay is worth $20 a ton, hay with 72% digestible nutrients is worth $35.

Another advantage is this: An early-cut grass may have just as much energy value as alfalfa cut on the same day. In Cornell tests, alfalfa and timothy both contained 70% digestible nutrients on June 1: 63% on June 15; 56% on July 1; and only 49% on July 15. Protein content was cut in half between June 1 and July 1.

The order in which crops appear in the rotation can make a difference in yields, say Michigan State University farm crops specialists.

If you live in the South, your best cutting dates will come earlier in the year. Cut according to stage of growth rather than the calendar. The four stages in the chart correspond with pre-bloom, bud, bloom and mature forage stages.

Cutting alfalfa at the early-bloom, or one-tenth bloom, stage is recommended in most states. It is a good balance between high yield and high protein.

Leaves start to drop soon after

Reprinted by permission from Production Credit Assn. Farming, 1000 Empire Bldg., Milwaukee 3

the plant reaches the tenth-bloom state. Since most of the feeding value is in the leaves, you want to save as many as possible. A poor job of haymaking may leave the feeding value of 25 bu. of corn in the field for every acre of alfalfa put up.

WHY EARLY CUTTING PAYS

Cutting Date	Feed Value Per Ton	
JUNE 1	$35.00	
Protein	Legume	18.7%
	Grass	13.5%
JUNE 15	$31.50	
Protein	Legume	14.5%
	Grass	10.0%
JULY 1	$28.00	
Protein	Legume	10.2%
	Grass	6.7%
JULY 15	$20.00	
Protein	Legume	6.4%
	Grass	3.7%

The longer you delay cutting, the more feeding value is lost. That's why we say "you can't afford to let the hay wait." Unless weeds are threatening to take your cash crop, forage deserves top priority.

Forage cut in the four stages shown on our chart was fed to dairy cows. They liked the tender, early-cut forage and ate twice as much as of the mature hay. It was possible to cut down on protein while still maintaining high total production of hay.

The differences in the various hays has been figured in terms of milk. A man feeding 30 cows would have to pay an extra $170 per month for grain if he feeds hay cut on July 1 instead of hay cut on June 15. And if that dairyman feeds July 15 cutting, it will cost him an extra $250 per month for supplemental grain. Good forage saves money!

How Age Affects Yields

Lactation yields, provided there is an adequate dry period between lactations (not less than six weeks), rise with age up to about the fourth lactation; but the rise is proportionately greater with the earlier lactations.

With Ayrshire heifers giving 600 gallons in their first lactation, subsequent expected yields would be: second lactation, 720 gallons (+ 20 per cent); third lactation, 800 gallons (+ 33 per cent); fourth lactation, 860 gallons (+43.3 per cent); fifth lactation, 900 gallons (+ 50 per cent.)

The percentage increase will on average be the same for all heifers, so that a higher lactation yield as a heifer will mean a higher lactation yield as a cow.

—Dairy Farmer (England)

Modern Hog Farming

What concrete and multiple farrowing can do for the hog business . .

Condensed from Breeder's Gazette

John B. Hensley

WHERE is the swine industry headed? Hog raising was once called a "mortgage lifting" project, a sideline, or a supplementary practice. Today . . ? Well, it has become more of an art.

Once we could run hogs somewhat as cattle, gather them at a certain age, and fatten them out to be 300 pound lard-buckets. We could let them wade through the mud and filth, wallow in the same puddle year after year, and get by with the old sow farrowing a 5-pig litter once a year. Nowadays, a hog producer of any size using these same practices would be out of business.

Almost every disease associated with hogs is closely related to filth. A sow has to farrow a large litter at least twice a year to offset her keep. And it is pretty obvious that hog lard is losing ground fast as a cooking oil. What now? Where do we start?

Some of the better hog raisers throughout the country have adopted the method of farrowing on concrete and never letting their hogs off until they are marketed. Asked why, they would give a number of advantages:

1. Disease Control

Worms and disease germs that usually harbor so well in refuse and filth can be eliminated on concrete. It's a simple procedure to clean and disinfect concrete. More sanitation means more pigs marketed; more pigs marketed means more income; and careful attention to the essentials of sanitation will probably do more than any one thing to increase profits in hog production.

2. Less Feed Required

Actually, less feed to produce a pound of gain is required when hogs are raised on concrete. Feed isn't wasted and will stay clean.

3. Gain Faster

Hogs will gain faster when they are in confinement and aren't required to wade through

Reprinted by permission from Breeder's Gazette, Columbia, Missouri

the mud. Clean fresh water can always be within a few steps.

The initial cost of building such an operation will be great, therefore the maximum use of it should be made. Year-round or multiple farrowing seems to not only provide for a fuller use of the equipment, but offers other advantages as well.

Multiple farrowing is accomplished by dividing sows into herds of two or three equal groups and breeding them to farrow twice a year. Three equal groups would mean a pig crop every two months and two equal groups would mean a crop every three months.

It doesn't make much sense to market 24% of our hogs in November and December, and only 14% in June and July. We do not gain a thing from flooded markets, sharp price changes, unbalanced income, and our hog raising equipment idle part of the time.

Multiple farrowing appears to be overcoming these problems.

How does it work? Let's follow a plan through on two sets of sows twice a year. We'll call them Group 1 and Group 2.

Select a date to breed that would fit your program best. For purposes of illustration, let's start breeding Group 1 the first of May. They will farrow around the 24th of August. This group will be kept in the farrowing pens from August 24 until the pigs are weaned around the 20th of October. They will be re-bred about 4 days after weaning and put out on pasture. Their pigs will be moved into a growing lot. Here the pigs will remain until they weigh about 100 pounds. Then they will go to the finishing pen where they are topped out. The selling period of the Group 1 pigs will be in February and March.

The 200 inch telescope at Mt. Palomar, California, picks up and reflects items 4 million times fainter than the human eye can see.

Now, to Group 2. These are bred the 1st of August. They will be ready to move into the farrowing pens just after the Group 1 sows have weaned their pigs and moved out; thus following the same cycle as Group 1.

It's important to get your sows settled the first time they are bred. Having to breed a second time might throw your schedule off. Breeding a maximum of 3 sows a day with one boar should eliminate this. To avoid having your sows come in heat at the same time, wean from two to three sows every other day.

Since timing is so important in this type of operation, get your boar far enough ahead of time

to check on a sow or two to make sure he isn't a shy breeder.

If you ask any of the many top hog farmers using the multiple farrowing why they do, they could give you a number of good reasons. These reasons listed below could overcome many of the hog raising problems you may now face.

1. Year-round Income

Since you will be marketing those pigs almost every two months of the year instead of the usual one or two, a steadier income is provided. This helps pay those equally steady bills.

2. Balancing Labor

In the slack farm season you'll be able to keep busy, and in the busiest seasons a smaller number of pigs on hand will lighten your barnyard chores. A hired man can also be better utilized under this system.

3. Allows Fuller Use of Equipment

Better equipment and buildings can be maintained because you are able to make year-round use of them. Depreciation on equipment and buildings is going to be about the same whether one litter or four litters utilize it. In this way the overhead is reduced.

4. Higher Price Average Possible

Being able to market more often gives an opportunity to get one or two bunches to market right during the year's peak. The others are spread out with enough flexibility to utilize monthly market high. A good plan can result in a small fraction of the pig crop hitting the low November and December markets.

People are funny. They want the front of the bus, the back of the church, and the middle of the road.

5. Better Boar Can Be Used

Your boar cost per litter is much less than under the one-litter system. Therefore, you can afford to buy a better boar.

Other advantages the multiple farrowing system offers are: less risk in disease because hogs aren't all bunched up into one period of the year; a reduction in speculation and a way to put hog raising on an assembly line basis; the farmer becomes a better credit risk; and he can get started in hog production with a smaller initial investment.

Neither multiple farrowing nor concrete confinement are new practices. They have been around for a number of years; however, their use to any degree has only been recent. With these practices and others the modern hog farmer is meeting intelligently the problems that have plagued the hog industry for so long.

Zero Grazing in Britain

Taking the whole idea with a pinch of salt, the British give green chopping a try . . .

Condensed from
The Agricultural Review

K. V. Runge, Edinburgh University

'ZERO grazing' is a term applied to a system akin to the old one of 'soiling', the summer feeding of mown grass to cattle in sheds or in yards. Because more efficient utilization of grass and grassland products is the main method by which cheaper milk can be produced, the practice has recently aroused a good deal of interest. The comparatively recent introduction of the complete forage harvester has made the system more easily practicable.

Under the new system, as in the old one, the forage (grass, alfalfa, etc.) is mown daily and is carted to the stock. In Britain, soiling was largely restricted to farms near to towns, the cattle being frequently kept within the town area. It has been more widely practiced in continental Europe, especially in areas with few fenced fields. The major disadvantage of the system is its high labor cost, but this has been of relatively little importance in some parts of the continent where family labor is often abundant in relation to the size of holding.

In the United States the system has spread because of the possibilities of almost complete mechanization of the process by means of the forage harvester and the side-unloading trailer, and it is practiced on both large and small farms. It is most common in California, particularly in areas where the main forage crop is irrigated alfalfa.

In order to explore the possibilities of the system under British conditions, it has been used throughout the past two summers on the dairy farm of the Edinburgh School of Agriculture — Langhill, near Roslin, Midlothian. The experiment is designed to compare two systems: one group of cows is milked in a traditional cowshed and is strip-grazed throughout the summer, while the other is loose-housed in a yard and is fed on mown herbage.

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The objective in zero grazing is to economize in the use of grass and thus to increase the stocking rate on the available area of pasture. Experience to date, both in Britain and America, has suggested that the system has certain advantages but also some important drawbacks.

One cow that produces 10,000 pounds of 4 per cent milk per year will return as much income above feed costs as three cows that produce 5,000 pounds of 4 per cent milk, a recent study in Georgia shows. Also, the three low producers require about three times as much labor as the one good cow.

Trials in Minnesota and in New Jersey have shown advantages of 6 per cent and 13½ per cent respectively when zero grazing has been compared with rotational grazing. The workers concerned explain the difference as due to the relatively small variation in the nutritive value of the mown forage by comparison with that of the pasturage. No such advantage has, indeed, been found under the conditions of the Edinburgh experiments; but it would seem that the saving of physical energy by zero grazing should increase the amount available for milk production.

It is also, presumably, an advantage that the cows' intake of grass can be more accurately controlled under the system of zero grazing than by strip grazing in the field. Savings of the order of 25 per cent in the area of pasture per cow have been reported from America. Again, it has been calculated that, with direct grazing, some 20 per cent of the herbage is wasted by trampling and by soiling with dung. Droppings alone may result in a 10 per cent loss of effective grazing area. The technique of grazing control must, however, have a considerable effect on the amount of waste; where intensive grazing with a back fence is practiced, the loss must be considerably less than it is under free-range conditions. Moreover, alternate grazing and cutting (for silage) must have a beneficial effect.

Again, selective grazing by cattle must result in variation in the nutritive value of the daily intake of grass. Such variation must be largely eliminated under the system of zero grazing, in which the herbage is mown and chopped before it is fed. Better control of the sward can be obtained by a machine than by the grazing animal.

In the Edinburgh experiment no spectacular economy in acreage has been achieved by zero grazing—the area required per cow being only very slightly less (0.77 acre per cow) than that of 0.87 acre under strip grazing. The system, however, does result

in more efficient utilization of the land, enabling more cows to be kept on a given area, or, alternatively, the feeding of the herd on a smaller acreage, with release of land for some other purpose.

To many farmers it seems that the chief attraction of zero grazing is that fields can be utilized under the system which, through distance or inaccessibility, cannot be used for grazing. Alfalfa or grass under irrigation can be more easily and more intensively managed when the herbage is mown rather than grazed. Again alfalfa, or the produce of irrigated land, can be better handled by carting off than by grazing. Then, too, grass can be cut under soil conditions that would result in much damage by the treading of grazing cows. Also, by moving the grazing area round the farm, a well-balanced cropping system is made possible.

Obviously, if the cattle do not go out to grass, the provision of water supplies to the fields becomes unnecessary. Further, zero grazing gives improved control of bloat — at times when herbage seems likely to induce bloat the intake can be restricted, the deficiency being made good by some alternative feed.

Against these considerations must be balanced some disadvantages, which vary in degree with circumstances. Firstly, costly machinery is required and labor input per cow is increased. A complete forage harvester is essential if field work is to be reduced to a minimum. The throughput for a sizeable herd must be high, requiring a machine with a wide cut. Such a machine, together with a trailer, makes a load that demands a fairly powerful tractor.

Heavy grazing of animals on sloping woodland increased water runoff in one year from 197 gallons to 9,308 gallons per acre, according to a Wisconsin study. Grazing packed the soil, reduced leaf litter, and lowered rates of moisture absorption. Tree growth also was slowed.

The capital requirement for such equipment may be considerable. But on farms where silage is already made on a considerable scale, such machinery may already be available. Again, the increased usage of the forage harvester should lead to a reduction in machinery charges per ton of grass cut.

In the United States a type of trailer with a cross-conveyor at the front or rear is widely used in order to deposit the cut herbage directly into the troughs. It operates best with grass that has been chopped into short lengths. In Britain, recent types of complete forage harvesters, which shear or bruise the grass into

pieces of varying length, are available.

Cattle kept indoors require somewhat more attention than those at grass. They must be fed, and the yards must be bedded and cleaned out. The labor cost will vary between a herd that is restricted to a small paddock and one kept in a straw-bedded yard.

The Caterpillar Tractor Company entertains neighborhood barbers at a special open house once each year. The company figures that the barbers talk to their clients, and this will give them something to talk about.

If the milking staff does not ordinarily carry out field duties during summer, the additional cost will be small. But the time occupied in shifting the electric fence, and in driving the cattle in and out, is saved; this saving may be set against the extra indoor demands of about 1½ hours per day.

If the cutting, carting and feeding of the grass can be done by the existing dairy staff, the extra labor cost of zero grazing over strip grazing may be almost negligible; in such case the extra cost of zero grazing will be that involved in operating the tractor and machine. But it is not everywhere convenient for this to be done, in which case some additional labor, involving additional cost, will be required.

When silage-making is in progress the machine will be required for this purpose and the meeting of the cows' daily requirements will upset the routine. Again, the cows must be fed as soon as possible after the morning milking has been finished and it may be difficult for the dairy staff to cut and feed by perhaps 9:30 a.m.

From the point of view of efficient maintenance the harvester should be regularly operated by one and the same member of the farm staff, and high efficiency in both machinery operation and cowmanship are not very often combined in a single worker.

At Langhill the routine has been that the field staff cut the grass and deliver it to the yard at 8 a.m., the tractor-man assisting the cowman to feed. A second load is then collected, and is left for the afternoon feed, when the cowman works alone.

The machine used was a flail-type harvester, with a trailer drawn behind; the unloading of the trailer was done by hand; mechanization would of course reduce the labor requirement, but would add to the machinery charges. Where the herd is small —perhays 25 or less—a modified type of trailer, from which the cattle can feed direct, may be used, being left in the yard until the load has been consumed.

Where the herd is housed in a bedded or partially bedded yard, requirements of straw will be at least doubled. The writer's experience is that straw requirements, with a partially bedded yard, are 8-10 lb. per cow per day—or say 14-18 cwt. per cow per summer. In areas where straw is plentiful the amount used may be of little or no importance, but if straw must be bought and transported over a distance, the cost of bedding per cow may run to $14.00 or more a year. Against this, the weight of dung produced will be greater; but under an intensive system of grazing the value of dung is not high, and there may be no local market for it.

The intensity of the business of milk production is increased by the adoption of zero grazing. Unless machinery management is highly efficient, it is not to be expected that its daily use over a period of six months will be trouble free. A standard of care and maintenance which will suffice for tools that are used only seasonally will not be adequate for the tackle used for zero grazing.

A recent development in the United States is the feeding of yarded cattle throughout the year on silage. This, of course, makes for a heavy labor peak during the silage-making season, but the system is more flexible during the grazing season than that in which fresh grass is fed. The data on zero grazing at Langhill during the summer of 1957 are summarized in the table.

Results from Zero-grazing in Summer 1957

Feeding Period April 4th — October 24th	
Number of cows	38
Av. daily consumption of grass[1]	145 lbs.
Total milk production	170,515 lbs.
Av. production per cow	4,488 lbs.
Av. production per cow per day	22.7 lbs.
Total concentrates fed	94 cwt.[2]
Milk production per cow per day from grass	20.3 lbs.
Summer milk per cow from grass	4,000 lbs.
Acreage of grass for herd	32
Acreage per cow	0.77
Milk production per acre/ grass (247 grazing days)	4,752 lbs.

[1]Containing 26.4 lbs. dry matter and providing an estimated 15.44 lbs. starch equivalent and 2.87 lbs. digestible crude protein.

[2]Equivalent to 2¾ cwt. per cow.

These results were obtained with a mixed herd of Ayrshires and Friesians. Production of milk per acre, at 4,752 lbs., is not outstandingly high, and comparable figures have been achieved under a system of intensive grazing. In-

cidentally, production in 1956 was of the same order as in 1957, namely 243 grazing days and 4,635 lbs. of milk per acre. The relatively low average milk yield is largely to be explained by the fact that a high proportion of the cows were autumn calves whose yields were of course low and falling at the start of the grazing season; hence the intake of nutrients was high in relation to the level of production.

A recently completed test involving the use of a tranquilizer, hydroxyzene, gave only slightly improved gains when fed for 84-days to Brahman-type heifers and bulls. Temperament, however, was improved noticeably. The tranquilizer was fed at low levels, 5 to 10 mg. per head per day.

It had been intended to feed grass at the rate of 150 lbs. per head per day, this being estimated to supply the amount of dry matter that would be eaten. A lesser quantity would have sufficed to meet requirements in terms of starch equivalent and digestible crude protein. The animals, however, were obviously not satisfied with such amount, and became unsettled. Again, the aim had been to feed grass with about 15 per cent of crude protein in the dry matter. This level of protein was not always maintained; it seems that grass of somewhat poorer quality, with a lower protein content, would have sufficed to meet requirements, with a consequent saving.

You've reached middle age when all you exercise is caution.

The period of zero grazing was considerably longer than the normal grazing period in the locality of the farm. While a total of 94 cwt. of concentrates was fed to the herd, some of this—about a fourth — was given during the period May-August purely as a carrier for magnesium. Magnesium tetany did occur, but the incidence of the condition was of the same order as in cows that were under normal grazing management. Foot troubles were less frequent in the zero-grazed herd than in comparable cattle at pasture.

Some wastage of grass occurred, the cows tending to draw the herbage under their feet and to throw it back into the troughs. It is hoped to minimize wastage in future by making the troughs 3 ft. 6 in wide at the top, tapering to 2 ft. 9 in. at the bottom. It is also hoped to reduce wastage by means of individual partitions between which the cow would be obliged to put her head in order to reach her grass, so restricting her movements.

The experiment described is being continued to determine more precisely the possibilities of the system; the past two seasons have been better than average for the growth of grass, particularly during late summer and autumn.

Zero grazing would seem to have advantages on many types of farm. It permits controlled feeding of grass of a known nutrient value; it can, by comparison with natural grazing, increase production and returns per acre of land, and it makes possible the use, for the milking herd, of the whole area of the farm. The degree of success will depend on the organization of the cutting and carting of the grass; where this can be done with the existing staff, the increased cost can be covered by the increase in production. If, however, the introduction of the system involves an increase in the labor force, the output of milk must be increased if there is to be an overall advantage. It may well be that, in many particular cases, a comparable increase in milk output per acre can be attained by improved conventional methods of grassland management.

Beef Calves on Milk Have Fewer Worms

Continuous milk in calves' diets may help to avoid early treatment for stomach and intestinal worms. Evidence from several scientific sources indicate that milk discourages development of parasites in the digestive tract.

U.S. Department of Agriculture scientists at Auburn, Ala., found that calves on milk harbored fewer of several common kinds of worms. In one test they compared calves on milk plus grain and hay with calves weaned at 12-16 months. They infected all with large stomach-worm larvae. A month later, the milk-fed calves had gained better and had fewer worms when killed.

In another test, researchers made a similar comparison of calves fed grain, hay, and milk with calves fed milk alone. Calves fed nothing but milk had smaller and far fewer worms, but their diet prevented them from gaining as well as the others.

To learn about worm infections acquired naturally by grazing, the scientists compared two groups of calves on pasture; one group received milk twice a day. At slaughter, both groups had about the same number of stomach worms, but calves on milk had fewer intestinal worms.

Researchers have no definite explanation for milk's effect on parasites — they just have observed that it happens.

—University of Wyoming

What's in Store for Dairying?

Three dairy leaders give their calculated guesses to the editors of Pennsylvania Farmer . .

Condensed from
Pennsylvania Farmer

BULK TANKS . . . Pipeline milkers . . . Zero pasture . . . Bulk feed . . . Loose housing . . . Non-fat milk.

These are some of the outward signs of a long smoldering dairy revolution.

What's in store for us next year? In 1970? Or 1980? What are the major trends in dairying today . . . ones we must consider carefully if we hope to stay in business for the next 25 years?

The editors of Pennsylvania Farmer asked a panel to give their calculated "guesses" on some of our major problems.

Panel members included Gerald A. Biggs, Fulton County dairyman and president of the Pennsylvania Farmers Association; Joe Taylor, head of the Dairy Science Extension Section at Penn State; J. Collins McSparran, a Lancaster County dairyman and Master of the Pennsylvania State Grange; and Joseph Canby, prominent Bucks County dairyman and past president of the Pennsylvania Dairymen's Association.

Don't let it be said these gentlemen sidestepped any of the questions — they hit them head on!

1. Now it's bulk tanks and wagon drying systems. Next, pipeline milkers. What follows?

Taylor — Within ten years 90 per cent of our Pennsylvania dairymen will be moving all milk in bulk, have gutter cleaners and mechanical feeding devices for both grain and forage. More grass silage will be fed. We will be cutting our forage crops between May 15 and 20 when the feeding value runs 60 to 70 per cent T.D.N. (on a dry hay basis) and when the weather permits making only grass silage. This high energy silage will be fed all during the year, except when there is a flush of pasture or ro-

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tation grazing. Hay will be made mostly from second and third crops and used to supplement silage.

McSparran — We are due to see the most drastic changes in the preserving of milk. Canning and treatment of milk by methods employing gamma rays will make it unnecessary to refrigerate milk. Milk factories are a distinct possibility in the production field.

Canby — More mechanically than ever, automatic feeding pellets, etc. Personally I do not feel it is the best in all cases. Losing the personal touch with the animals is not good. Labor may force us to come to these new methods.

Biggs — These are labor saving devices. With less farm labor and higher wages we have only scratched the surface in this field.

2. How many cows should we have per man to stay in the dairy business during the next decade?

Taylor — Enough cows to produce 250,000 pounds of milk per year, per man on the farm.

Level of Production Per Cow lbs.	Number of Cows Per Man
12,000 (4% ave. test)	20
10,000 (4% ave. test)	25
8,000 (4% ave. test)	30
6,000 (4% ave. test)	Forget him

McSparran — Number of cows never has been a satisfactory yardstick for measuring efficiency of operation and it is high time we quit talking cow numbers. Pounds of milk per worker employed is a much more realistic measurement, and I think it is generally conceded that 200,000 pounds of milk per worker per year is rather adequate production at the present time. There is no question that this amount will have to be raised.

Canby — Between 30 and 40 cows.

Biggs — With the progress we are making 40 to 60 cows per man will not be uncommon.

3. (a)—What kind of herd average will a dairyman need ten years from now?

Taylor — A minimum of 10,000 pounds of four per cent fat corrected milk.

McSparran — I believe a 500-pound fat average will be just as common ten years from now as a 400-pound average is now.

Canby — 450 pounds butterfat and up.

Briggs — Cow production will increase 20 to 30 per cent.

(b)—What size farm?

Taylor — Three acres of tillable land per 1,000 pound animal on the farm.

McSparran—The farm should be large enough to produce all the roughage needed by the dairy herd. It is also desirable that the farm produce a sizable portion of the grain needed. However, this last requirement can

well disappear depending on government grain programs in the future.

Canby — A minimum of 150 to 200 acres; preferably twice this size.

Biggs — Acres are not important. There seems to be no limit to land production.

Farmers' expenditures for health care average $250 per family each year, according to a recent survey.

(c)—What amount of capital investment?

Taylor — $1,000 per milk cow on the farm. Here is where high production per cow shows real efficiency.

McSparran — Capital investment will continue to rise.

Canby—Minimum of $40,000.

Biggs—$20,000 to $30,000 per man unit.

4. Will the butterfat test continue to be the measure of milk quality?

Taylor — Yes, because other milk constituents are correlated to the per cent of butterfat, and it is easier and more economical to run butterfat.

McSparran — I believe butterfat test will continue to be one of the measurements of milk quality. Its importance may decline as other factors such as milk solids are given more recognition.

Canby — I think it is entirely possible that solid non-fat will be not only the measure of quality but basis of payment.

Biggs—No, milk solids are now in the picture.

5. This is the age of specialists. Just how specialized will dairymen become in the next 20 years?

Taylor — The one-man dairy farm will pass out of the picture. It will be replaced by a two-man or more operation. One man will specialize in producing high-quality feed (the agronomist). The cow man will milk and manage the cows. In large operations a machinery specialist will prove to be most valuable. For labor efficiency these various specialists will cross over to relieve peak labor loads, but still call the strikes in his specialized area. The combined objective of all will be to produce more milk from each cow the most economical way possible.

McSparran—There is no question that the specialization that is appearing in the dairy industry will continue and its spread will be determined entirely by the policies followed by the milk industry. Again, if we allow the milk industry to go through a complete shake down or war between producers then specialization will be of great importance.

Canby—I think that a Pennsylvania dairyman will have to specialize more than ever and

become less and less a general farmer, and pay strict attention to his dairy operation particularly along lines of feed production, breeding and production of quality product.

Biggs—I would hate to venture a guess, but I am sure they will keep pace with progress.

6. Is integration in the cards for dairying? How would it work?

Taylor—The dairy industry is already partially integrated thru farmer-owned milk marketing cooperatives. Instead of one man or a corporation furnishing the capital, many individual farmers have the capital control. In some areas these farmer cooperatives have control of the milk supply all the way to the consumer. In other areas they contract with local dealers who process and deliver the milk to the consumer. This integration system will expand and may include contractual integration between farmer marketing and purchasing cooperatives.

McSparran—I certainly hope we can prevent the integration of the dairy industry by outside interests. It could conceivably happen, although, due to the high investment necessary, I believe it will be slower in coming than in some of the other fields of agricultural activity. We have already seen integration in some areas where as many as 5,000 cows are being kept in a single herd with the production and distribution all being done under the same ownership.

Canby—It is possible but not nearly as much so here in the East as in the West, particularly the far West.

Biggs—This is not impossible, but I would say it is a long way off, because of the individuality of the dairy business.

Larger Dairy Herd Means Less Labor Per Cow

Labor requirements per cow go down as the herd expands on a dairy farm.

A USDA study shows an average of 129 man-hours a year to take care of a 10-cow herd. In the same study, a 30-cow herd needed only 80-man hours per cow. Thus tripling the size of the herd less than doubled the work needed to care for it.

Dairy farming takes about the most labor of any farm operation. Only tobacco production takes more work. It takes about 52 man-hours of labor on a dairy farm today to produce $100 worth of product. Beef cattle take about 22 man-hours for each $100 worth of product, and broilers need only 13 man-hours.

—Illinois Extension

New for You . . .

AL HALLER

The New — New Holland "178" Baler is self-propelled and push-buttoned. The operator's seat is immediately behind the pick-up with the bale chute to his left. He should be able to see every stem of hay from swath to bale. To do as well with present equipment, a good baler operator would like to have two extra eyes in the back of his head or the owl's trick of swiveling his head 180 degrees.

Right up in front of the New Holland operator is a control panel just like the dashboard on the family car. One lever controls ground speed, another baling speed. Electric starter, pick-up control, fuel gauge fill the panel and give the operator finger-tip control.

A husky 51 horsepower engine keeps the "178" humming along at a baling rate up to 400 bales per hour. This looks like a substantial contribution to grassland farming.

New Nylon Nuts — need no tightening. Nylon pellets have been incorporated into new Wedglock, self-locking nuts and set screws manufactured in England. Designed for use on vibrating farm machinery, the nuts or screws are designed to lock in any position without being seated. This feature makes them very suitable for adjustment purposes. Temperatures between 70 and 250 degrees, oil, gasoline, or water are said to have no effect on the locking action.

The "Gunny-sack" has a new competitor. Spencer Chemical Co., has started marketing its "Mr. N." ammonium nitrate fertilizer in plastic bags made of material about five times as heavy as the smaller polyethylene bags familiar as fruit and vegetable packages. Spencer is the first company to use these tough containers that are said to withstand tossing from a truck going thirty miles per hour onto a rough asphalt pavement.

Since a sack of this plastic film is air tight, waterproof and corrosion proof, the farmer can unload them anywhere in the open and store them where he would never think of leaving paper bags of moisture-sensitive fertilizer.

The new ammonium nitrate bag when emptied and washed out has some unique uses. It's a "natural" for keeping all types of material dry and free from contamination.

No doubt, farmers will soon be buying a lot of fertilizer, feed, seed corn and other farm supplies in "giant" plastic bags.

Plastics use on the farm, especially with silage, is evidently here to stay. A Belgian system of silage making under vacuum in plastic is claimed to minimize protein loss, reduce heating, avoid combustion of the carbo-hydrate and prevent formation of butyric acid.

Studies show that 70 to 80 per cent of the insect infestations in stored wheat arise because insects are already in the bin when the new wheat is stored.

The silage is made in a stack on a circular sheet of light plastic placed on the ground. The stack is shaped during building by a 20 inch deep cylindrical form which is raised as the height increases.

At 9 feet the ring form is removed and the silage covered with a "dome" of heavier plastic material which is sealed to the ground sheet. The silage is thus enclosed in an airtight envelope from which the air is exhausted with a vacuum pump. It is compressed to about half its original bulk by atmospheric pressure.

"Knuckle busting should be cut down considerably by a great improvement in the ever-present crescent wrench. The crescent wrench is the symbolic hand tool of machine age farming as the fork or shovel represent the hand tools of out-of-date farming methods. Proto-Tool Co., of Los Angeles manufactures a "clik-stop" crescent wrench that is automatically "adjustable." As the knurl is turned, jaw openings are held fast and can't change position.

Set the opening, then drop it, then use it and you will find it always holds its opening size. It saves time in resetting the wrench every time you go back to a fitting as you do with other adjustables. The precision adjustment eliminates slipping.

This wrench is now on sale in five popular sizes, at most outlets that sell tools. Look for Proto's Golden Knurl Clik Stop Wrench.

Soil Compaction Prevention

Prevention is still the best answer to soil compaction, says a Purdue University agronomist. Use of heavy farm machinery after a rain, when the soil is wet, tends to pack the surface and subsurface soil to almost a concrete-like consistency. The surface layer can easily be broken up, but the hardpan formed just beneath the plow layer is difficult to remove.

Will You Soon Order "Heifer Calves ONLY"?

Along with ova transfers to produce more calves from best cows, determining sex of the calf before breeding the cow may come in the future. Here's a late report from an English Journal . .

Condensed from Dairy Farmer

Dr. Paul Jaffe,
University of Bristol (England)

IN cattle, maleness is determined by the possession of an unequal pair of sex chromosomes (X Y), and females are characterized by an equal pair (X X).

Since the Y chromosome is smaller than the X, male-determining spermatoza (carrying the Y chromosome) should be very slightly lighter than female-determining ones which carry the X chromosome.

It is possible to achieve partial separation of fractions differing minutely in weight by the use of a centrifuge (a laboratory machine much like the Babcock tester) but the difficulty in working with living material is that it may not survive such treatment.

Some Swedish results suggest that by the use of sufficiently low centrifuging speeds, this trouble may be overcome.

One experiment, using the fraction deposited when spinning at 1,100 rpm, produced 11 calves out of 23 inseminations and all of them were males.

Any farm and ranch employer who pays $150 or more to a laborer or who hires a farm hand 20 days or more during a year must pay social security taxes on the wages involved.

More recently 142 inseminations were performed with semen samples spun at 1,000 and 1,100 rpm, and 63 calves (equal to a fertility rate of 42.4 per cent) were produced, a figure that compares unfavorably with the conception rate of 60.5 per cent in the control group.

The sex ratio of 36 males and 27 females (42.9 per cent) does

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not differ significantly from that normally observed in cattle. However, when the cows used in this experiment were grouped according to their fertility, the sex ratio in the more fertile group was 28 females to 9 males (24.3 per cent). In the less fertile group this was reversed, and the results were 8 females and 18 males (69.2 per cent).

The difference in sex ratio between these two groups was significant. It is suggested that the lower fertility may be due to mechanical damage of the spermatozoa during centrifuging and that the female-determining fraction is more sensitive.

This explains the absence of female calves in the first experiment and the difference in sex ratio between the high and low fertility groups in the second.

How to Cut Dairy Feed Costs

Feed normally represents about half of the cost of milk production. One effective way to increase dairy production, suggests G. A. Williams, Purdue University dairyman, is to cut the feed costs.

Research points the way to do this by replacing some of the grain and concentrates usually fed to dairy cattle with more high quality roughage.

At the USDA's Beltsville, Md., research center, for instance, it was found that dairy heifers fed large amounts of good forage reached normal weights at 24 months of age with much less grain than is usually fed. In contrast to the 2,000 to 3,000 pounds of grain commonly consumed before first calving, the Beltsville heifers grew normally on 560 pounds of grain plus plenty of good forage.

The dairyman experimenting with this feed cost cutting project discontinued feeding milk at 60 days rather than six months, and stopped feeding grain at 9 months. After ten days of age, these 9 Holstein and 25 Jersey calves were given all the forage they could eat.

These studies indicate the importance of maintaining a high legume content in the roughage ration. Alfalfa hay was combined with corn silage—timothy hay and corn silage—timothy hay and orchard grass-ladino hay, and bromegrass ladino hay plus corn silage.

Numerous other studies have shown how similar savings can be realized by substituting high-quality hay for some of the grain, and concentrates fed to milking herds, according to Williams.

—Purdue University

The New Plastic Silo Covers

They are not expensive and they do the job. "Wouldn't be without them," says this dairyman . . .

Condensed from Research and Farming

Guy S. Parsons

PLASTIC covers are making horizontal silos look more attractive than ever. Scientists of USDA's Agricultural Research Service have shown that covers of black polyethylene, vinyl or neoprene-coated nylon can provide an air-tight seal that reduces spoilage sharply.

Plastic covers reduced surface spoilage and total storage losses in horizontal silos to the level commonly found in upright silos in the USDA experiments.

What does a dairyman think of plastic silo covers?

"I wouldn't think of filling my trench silos without using plastic covers," says Caswell County, North Carolina, dairyman Cary Watkins.

Watkins has used polyethylene plastic covers for the past 3 years with excellent results. By packing his silage properly and using plastic covers correctly he has had practically no spoilage.

Solves Spoilage Problem

Greater spoilage due to the large surface area has been the big drawback of bunker and trench silos. Yet many farmers have built these horizontal silos. They are low in cost, easy to fill mechanically, and the silage is readily accessible for self or mechanical feeding.

Agricultural engineers say an easy method of estimating the gallons of water in a farm pond is to multiply one-third of the maximum depth in feet times the surface area in acres by 327,000.

Now, plastic covers can overcome this drawback of excessive spoilage in horizontal silos.

In 3 years of USDA tests neoprene-supported nylon (10 ounce weight) was more durable than unsupported vinyl plastic and polyethylene films. Also, the supported cover is less likely to be punctured or damaged by the weighting material.

Nylon Costs More—Lasts Longer

The nylon sheeting is more expensive than unsupported covers.

Reprinted from Research and Farming, North Carolina Experiment Station, Raleigh, N. Carolina

But it should last longer—from 5 to 10 years.

A dairy cow that's worth her place in the herd should produce at least 7,000 pounds of milk a year to pay her keep and pay a worth-while profit.

The less expensive films probably will last from 1 to 3 years. They have been used very successfully. Vinyl film is less likely to become punctured than polyethylene. It's easier to patch, too.

The cost of any of the materials ranges from about 1½ to 4 cents per square foot per year, depending on how you use it and the care you give it.

Watkins puts 2 to 3 inches of sawdust on top of his plastic covers. This reduces the hazard of air leakage through punctures or when the cover is rolled back for feeding.

"If a man is going to stay in the dairy business," Watkins adds, "he needs to feed plenty of silage." He now has 3 concrete-floored trench silos that hold 575 tons of silage. This spring he plans to build another 200-ton trench silo so he can store enough silage for year-around feeding.

Three-Way Approach Aids Dairy Income

A three-way "intensification" plan has increased returns from a dairy herd by almost 20 per cent in the past three years on an Aitkin county, Minnesota, farm.

For the 1955-56 record-keeping year, Norman Wright's 29-cow herd of Guernseys averaged 395 pounds butterfat each — already 150 pounds above state average. Twelve months later the average was 420. Last year, the herd averaged a whopping 470 pounds per cow.

What made the change? "Mainly, three things," says Wright.

"First thing, it seems to me, was getting more feed value from forages, through heavier use of fertilizer, more intensive pasture management and silage.

"Second, although I've kept dairy records for 13 years, I've recently done stricter culling in the herd. When an individual cow slips in production, out she goes."

"Third," Wright says, "thanks to artificial breeding and better calf selection, the heifers do better from the beginning now. Not long ago, they averaged around 300 pounds butterfat for the first year. Now, they all start between 350 and 400 and some even higher." —*University Farm and Home News*

The Feeding and Management of Dairy Calves

It's an art and a science. "Calf sense" is the most important single tool . . .

Condensed from Western Dairy Journal

Howard J. Merrill

PROPER feeding of the young dairy animal commences long before birth.

The dairyman should be concerned with adequate nutrition of the dam to promote good health, normal heat periods, ovulation and fertilization of a healthy egg within the reproductive tract and maintenance and development of a healthy fetus.

The nutrient demands of the unborn calf upon the dam are heaviest during the final three months of pregnancy. When necessary, the body of the mother will be depleted to fulfill nutrient needs of the fetus. A dry period of adequate length, during which the pregnant cow is fed liberally, increases the probability of a strong, vigorous calf at birth.

It is usually desirable for cow and calf to remain together—with a minimum of disturbance—for at least 12 hours following birth of the calf (parturition).

Irrespective of the system of feeding and management to be followed later, the newborn calf should obtain colostrum soon after birth, either directly from the udder of the dam—with assistance from the herdsman if necessary—or from a nipple bottle or pail. Colostrum feeding should continue as long as possible, utilizing additional colostrum milk from fresh cows other than the dam, when such a surplus is available.

The importance of colostrum to the well-being of the very young calf cannot be overemphasized. It is nutritionally the most valuable milk produced at any time during the lactation, being

Reprinted by permission from Western Dairy Journal, 4511 Produce Plaza, Los Angeles 58, Calif.

much richer than ordinary milk in proteins, minerals and vitamins. It contains a high concentration of globulin, a blood protein containing antibodies which have the power of temporarily increasing the resistance of the calf to disease. The calf is born lacking these protective agents and is dependent upon colostrum for its supply. Colostrum is also important for its regulatory effects upon the digestive system.

When a calf must be raised without colostrum, vitamin-fortified (A and D) whole milk or a commercial milk replacer may be used. A raw egg added to each feeding of colostrum substitute may be especially beneficial to a weak calf.

Raising a calf involves the expenditure of considerable time, effort and expense. Only a healthy, vigorous calf with known potential inheritance and individual promise should be given consideration as a herd replacement. A calf of unknown ancestry is likely to prove a poor investment.

Some dairymen discriminate against a first-born calf because it is usually smaller at birth than are its brothers and sisters born later. For breeding purposes, the healthy offspring of a first-calf heifer is equally as valuable as those born later. The first calf will reach its full inherited size at maturity, if properly fed and managed.

The practice in some quarters of breeding dairy heifers to beef bulls deprives the dairy industry of thousands of potential replacement heifer calves annually. Dairy heifers should be bred artificially to proved sires, or naturally to carefully selected young purebred dairy bulls.

Young calves getting too much colostrum may scour, say dairy specialists.

The following management factors should be emphasized:

Cleanliness of feeding utensils is all-important. Pails, bottles, nipples and other feeding equipment should be cleaned and sanitized as carefully as market milk equipment. Fly control is essential.

Temperature of milk or milk replacement should approximate body temperatures and should not fluctuate more than 5-10 degrees. A dairy thermometer should be used when preparing liquid calf feeds.

Overfeeding is probably the most universal and serious error made by inexperienced herdsmen, being especially noticeable in mixed herds where calves of large and small breeds are raised together. The calf should never be allowed unrestricted nursing after

being separated from the dam for a long period. Bottle or pail feeding should not exceed 10% of the body weight, daily. Commercial milk replacements should be prepared and fed strictly in accordance with recommendations of the manufacturer. All changes in feeding should be made gradually.

Routine feeding of 100 milligrams of aureomycin at the time the calf is removed from the cow may be helpful in checking the effects of disease germs picked up by the calf during the first few hours after birth.

Because the newborn calf accepts nipple feeding more readily than pail feeding, it is advisable to use this method for several days before weaning to open pail feeding. This procedure reduces danger of setback which frequently follows impatient, unsuccessful attempts to pail feed immediately after separation of cow and calf. The first feeding should be limited—the amount fed depending upon the length of time the calf has been away from the dam.

As the calf is removed from the cow, she should be assigned a permanent herd number and be given a means of positive identification. This may be accomplished by the use of eartag, tatoo or both. Sire, dam, birthdate and subsequent health records and breeding dates should all become a part of the permanent herd record.

These weights and measurements may be used as guides in determination of comparative growth rates.

	Age (months)	Height at Withers (inches)	Heart Girth (inches)	Body Weight (lb.)
HOLSTEINS	Birth	29.0	28.0	90
	2	32.5	35.5	150
	4	36.25	42.75	250
	6	39.75	49.0	375
GUERNSEYS	Birth	26.5	25.5	65
	2	30.25	30.5	105
	4	33.75	37.75	175
	6	37.25	43.5	265
JERSEYS	Birth	25.75	25.0	55
	2	28.75	28.5	90
	4	32.75	36.5	165
	6	36.25	42.5	250

The calf should be provided with a clean, dry, well-bedded individual pen furnishing shade and shelter. The navel cord and stump should be immersed in tincture of iodine. Calf should be examined for abnormalties, supernumerary (extra) teats. Any veterinarian can demonstrate the removal of extra teats by the use of curved surgical scissors, trimming the excess tissue flush with the skin of the udder. The teat to be removed—and the area immediately surrounding it—should be cleaned with alcohol before removal and the wound saturated with tincture of iodine afterward.

Dehorning may be accomplished most easily by use of an electric dehorner during the first week. The horn button should be "popped out" and removed completely.

It is desirable to keep calves in individual pens as long as possible. In large calf growing enterprises, calves are usually grouped by the time they reach 2-3 weeks of age. When this step becomes necessary, the calves should be stanchioned at feeding time to prevent sucking. This tendency may be reduced by the feeding of grain immediately following liquid feeding. At each feeding, a small amount of grain should be placed in the mouth and on the muzzle, until the calf learns to eat of its own accord.

Permanent udder damage results when calves are allowed to suck one another. Most suckers may be discouraged of the habit by inserting a lightweight bull ring in the nose. Others are incurable and must be isolated or removed from the herd.

The successful calf raiser never relaxes in his continuous fight against disease. He must, through study and experience, learn to observe and recognize the little telltale signs—the "look in the eye"; the angle at which the ears are carried; "runny" noses; abnormal consistency, color or odor of droppings; lack of appetite; bloating; limping; rapid breathing; coughing; shivering; rough hair coat; withdrawal from the herd—and all the intangibles which, to the alert herdsman, indicate trouble. He should carry and use a veterinary thermometer. The rectal temperature of a healthy calf should be approximately 101.5°-102° F.

Calf Ailments

Development of the sulfa drugs and broad-spectrum antibiotics has made it possible for an experienced herdsman to successfully treat many calf ailments. However, the services of a competent veterinarian are of inestimable value. His specialized professional training and experience should be utilized in the development of a comprehensive program of disease prevention for the calf herd.

Under southern California conditions, it is advisable to vaccinate against hemorrhagic septicemia, malignant edema and blackleg at approximately 30 days of age. Calves should be vaccinated against brucellosis at 4-6 months of age.

Some localities and individual premises harbor disease-causing bacteria which force dairymen to resort to the use of autogenous bacterins and other special disease-fighting weapons in order to hold down death losses and operate profitably. Paratyphoid in calves is one such infection which has been controlled through use of autogenous bacterins. In such cases, control results from careful teamwork between dairyman, veterinarian and laboratory personnel.

Growth Rate Determined

Calves and heifers should be grown rapidly and continuously, but should not be allowed to become fat. Excessive fattening of dairy youngstock serves no known useful purpose, is uneconomical and may, in some instances, actually be harmful if fat deposits interfere with normal development of reproductory and mammary systems. Calves and heifers should be fed to produce condition and body form similar to that desired in a mature cow in good milking condition. Growth rate may be determined by scale weights or by measurements of heart girth and height at withers.

Calf raising is essentially a nursing job, dependent for satisfactory results upon careful attention to many details which individually may, at times, appear to be relatively insignificant, but which, taken collectively determine the success or failure of the enterprise.

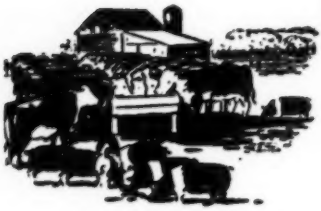
No single system or method is infallible, or acceptable in its entirety for universal application. The raising of calves is an art as well as a science—and "calf sense" is the most important single tool with which to apply the fundamental principles of good calf husbandry.

Horizontal Silos Can Produce High Quality Feed

High quality silage can be produced in trenches, bunkers, and other horizontal silos if the silage is packed properly.

Tests at the U. S. Department of Agriculture's research center, Beltsville, Md., have given good results with horizontal silos when the air is forced out of the silage by driving a tractor back and forth over it doing the packing. For the best results, silage should be mounded, enclosed with an airtight plastic cover stretched tight and pressed down to eliminate air pockets, sealed at the edges and weighted over the whole area. —*Delaware Extension*

The Outlook for Beef Cattle



Prospects for the next few years appear considerably above average, but keep your fingers crossed . . .

Condensed from
The American Hereford Journal

Professor Gordon B. Nance
University of Missouri

BEEF cattle prices are high now. They are expected to continue high for at least the next three years. That is the outlook.

A wise man said long ago that the years teach much that the days never know. So let us study the numbers and purchasing power of beef cattle. In the chart on the following page, "Purchasing power" is how much of other things a beef animal will buy. It is calculated from the value per head of beef cattle on January 1 each year, and the prices of other things at that time—and the 1910-14 period is considered 100.

Note first in the chart that the purchasing power of beef cattle is now high—170 (left side of chart) as compared to 100 in 1910-14. That is, a beef animal now will buy 70 per cent more of other things than it would have bought in the base period. Or, saying it another way, 10 beef animals will buy as much of other things now as 17 such animals would have bought in 1910-14.

Beef cattle prices are now higher than they were in any year prior to 1948. Even in the recent so called "low price" years — 1954 to 1957 — cattle prices, relatively, were 25 to 35 per cent higher than in the base period.

Beef Cattle Cycles

Note, also, the astounding regularity of the cycles in numbers and purchasing power of beef cattle prior to 1934. The high points in purchasing power were 14 to 16 years apart, without exception. The low points in purchasing power, and the high and low points in numbers, show comparable regularity.

The causes for these cycles are farmers' r e s p o n s e s to prices. When beef cattle prices—and profits of beef cattle production —are low, farmers market a larger percentage of their calf crops and of their breeding herds, thereby reducing their breeding

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herds. This also increases marketings and the supplies of beef offered for sale and causes prices to fall still lower.

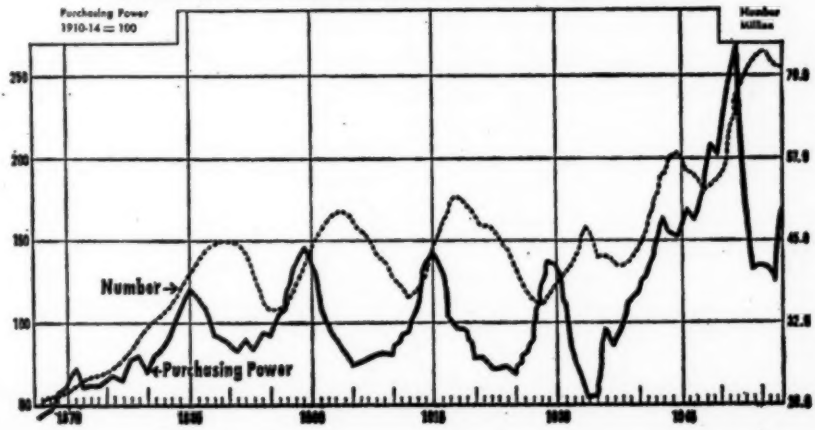
When breeding herds have been reduced to the extent that marketings decline, supplies of beef for sale decrease, prices rise and beef cattle production becomes more profitable. Farmers then keep larger percentages of their calf crops and old cows to increase their breeding herds. This reduces marketings and supplies of beef still more, which causes prices to rise still further. When herds have increased to the extent that marketings increase, prices begin to fall—and the cycle starts all over again.

The production rate of cattle and the time taken by farmers to react to these price changes determine the length of these cycles, which up to 1934 was about 15 years.

The cycles since 1934 have not conformed to their previous pattern. In the numbers cycle, the down-swings have been shorter and less, and the up-swings have continued their usual length and size. Before 1934, the down-swings were about eight years in length and the declines in numbers averaged 25 per cent. Since 1934, the declines have been three or four years in length and the declines in numbers less than 12 per cent. The up-swings both before and after 1934 have been about eight years in length and the increases in numbers have averaged 40 per cent.

As a result of smaller declines on the down-swings, and the usual increases on the up-swings, cattle numbers are 15 to 20 per

NUMBER AND PURCHASING POWER OF BEEF CATTLE



cent higher now than they otherwise would have been.

Factors Which Contributed

Several factors have contributed to this increase in cattle numbers. Prices have increased rapidly since 1934, as is shown by the chart. Acreage allotments have reduced planting of some crops and left larger acreages for grazing. Then cattle production has increased rapidly and continuously in the South. In a tier of five southern states, cattle numbers have increased each year, and a total of 87 per cent since 1938. The increase for the country as a whole during this period has been only about half this much.

Cattle prices increased rapidly and almost continuously after 1934, and in 1952 were twice as high as in any year prior to 1943. The reason for this phenomenal rise in price is not readily explained by the data. It could not be reduced supplies of beef, because per capita supplies averaged 58.7 pounds from 1935 to 1954, and 5 per cent more than the 55.9 pounds from 1915 to 1934.

It is not likely due to increased preferences for beef over pork, because this was not markedly reflected in prices received by farmers until 1955. It is difficult to measure statistically the increase in the preference for beef, but it is easy to see that it has increased. Prior to 1955, whereever per capita supplies of pork and beef were near the same, hog prices were 25 to 35 per cent higher per hundred pounds than beef cattle prices.

The most marked change in preference seems to have occurred between 1954 and 1955. In 1953 and 1954, beef supplies exceeded pork supplies by 28 per cent (78 pounds beef, 61 pounds pork), and hog prices were 33 per cent above cattle prices ($16.15 beef cattle, $21.50 hogs). In 1955, 1956 and 1957, beef supplies averaged 25 per cent larger than pork (81 pounds beef, 65 pounds pork) and hog and beef cattle prices were about the same ($15.-93 beef cattle, $15.73 hogs).

The above are the data. The writer has checked them carefully, but he is still highly skeptical. He just can't believe that consumer preferences can change that much that quickly—especially in respect to two products with which consumers have been acquainted so long and so well and in which there has been so little change. He believes there must be strong factors other than changes in consumer preference to account for the relatively much higher prices for beef cattle during the last three years.

Future Cattle Prices

The above is history—all in the past. Let us see what it indicates for future cattle prices.

The cattle numbers cycle evidently now is beginning its upswing. There was no reduction in numbers from Jan. 1, 1957, to Jan. 1, 1958. Slaughter in the first quarter of this year was 13 per cent below that in the same quarter of 1957. This means that cattle are being held to increase herds and that numbers are expanding.

Heretofore when cattle numbers began to increase, this increase continued for at least six years. During this increase in numbers, cows and heifers are held back to add to breeding herds and marketings are decreased. These reduced supplies of beef result in higher prices.

As stated earlier, cattle cycles have been erratic in the last 20 years, and the current increase in breeding herds, reduced marketings and higher prices may not continue for the usual six or seven years. But it appears most probable that it will continue for at least three years and that cattle prices will be strong and rising during that period.

While we expect beef cattle prices to be highly favorable for the next several years, there are several factors that should prevent our optimism from getting out of hand.

First, we are beginning this increase in numbers when numbers are already at near-record highs. Numbers are now only 3 per cent below their all-time peak in 1956. Heretofore these declines have been 10 per cent or more. It would require only a slight increase in present cow numbers to bring beef production to record-breaking levels.

Second, it is doubted that we will have another such upsurge in demand for beef as we have had in the last three or four years.

Third, we do not expect such rapid increases in prices or that prices will reach such high levels as we had in 1951 and 1952. These apparently were unjustified by economic factors. This is indicated by the drastic price decline of more than 50 per cent in 1953 and 1954.

It is recognized, of course, that non-forseeable future developments could change the outlook for beef cattle radically. Among such developments could be widespread and continued drouths, wars, depressions, greatly accelerated inflation, etc. These are not anticipated in this analysis.

Summary of the Situation

Let us summarize the above:

1. Cattle prices are now relatively high, and higher than in any year prior to 1948.
2. Cattle prices are expected to continue high and rising for three years or longer while breeding herds are being built up.

3. Cattle prices in the next few years are not expected to rise as rapidly or to as high level as in 1951 and 1952 because these appear unreasonable.
4. Prospect for profits in beef cattle during the next few years appear considerably above average. Of course, good judgment in buying and selling will be required for profitable operation these next few years—as they always are.

'Steaming-Up' of Little Value

A method of preparing a dairy cow for lactation known as "steaming-up" seems to be of little value, report Virginia dairy scientists.

In the steaming-up procedure, the cow receives grain for about 6 weeks before the expected calving date with the allotment being increased weekly. In the last week of the dry period the cow receives grain equal to 75% of her estimated grain needs for early lactation.

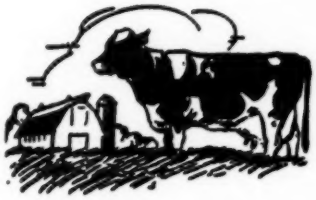
Recent work has shown that this practice apparently offers no distinct advantages as a method of feeding the dry cow. At the Illinois Experiment Station the feeding of from 4 to 12 pounds of grain per head daily for a period of 40 to 42 days before expected calving did not significantly increase the yield of fat corrected milk for the first 84 days of lactation. The incidence or severity of udder congestion was not materially increased by the heavy grain feeding.

In a New York study, 3 groups of cows were used over a 2-year period to study the effect of feeding no grain, 6 pounds daily, and 15 pounds daily during an 8-week dry period, on the severity of udder congestion. All cows were fed silage and hay. The cows received 10 pounds of grain on the day after calving and the amount was increased one pound daily until they received the amount of grain warranted by their production. In this study, level of grain feeding during the dry period had little effect on severity of udder edema at calving; heavy grain feeding immediately after calving did not seem to increase edema; high-producing cows seemed to have more udder congestion than low producers; udder congestion was no worse in fat cows than in thin cows; and the trouble seemed to be inherited since cows tended to have the same amount of edema year after year regardless of the type and amount of feed eaten.

Important point is to have the cow in good condition (not too fat) at calving time regardless of feeding, say dairy specialists.

—Virginia Polytechnic Institute

Can Your Best Cow "Have" Several Calves a Year?



Scientists report on progress in "ova transfer"

Condensed from
Guernsey Breeders' Journal

ALTHOUGH they haven't yet solved the "egg transfer" problem in dairy cattle, the University of Minnesota scientists studying it have uncovered some important basic information.

For one thing, the scientists have found that injecting normally high amounts of "gonadotrophic" hormones into cows can cause them to "superovulate." This means producing a dozen or more eggs during ovulation, instead of just one or two as is normally the case. The hormones used this way are the same that normally stimulate ovulation in the animal.

This finding has major implications, report P. J. Dziuk, J. D. Donker, dairy physiologists. It means that if there were ways to keep these eggs alive and transfer them to the uteri of other cows, cattle breeders could raise many more calves from their better cows.

So far, no one has developed a practical way to make this egg —or "ova"—transfer. In other states, the transfer has been successfully completed in a few cases, resulting in live calves. But each time, it called for major surgery and resulted in death of the "donor" animal.

A community should have 4½ hospital bed accommodations per 1000 population to be able to take care of normal needs.

Scientists are now searching for a non-surgical method for making this transfer. Although such a technique is not in sight, they have made some important advances, in addition to the finding on "super-ovulation."

They have found that:

"Superovulation" can be repeated several times in the same cow, without hurting her. Many

Reprinted by permission from Guernsey Breeders' Journal, Peterborough, New Hampshire

researchers in the past thought superovulation might be possible only once in any one animal.

Putting small quantities of fluid from the uterus of one cow into the uterus of another won't kill a fetus if one is present, in the "recipient" cow. This fluid transfer is what would be necessary in a non-surgical egg transplant method.

A "biopsy" technique can be used for studying live tissue in the uterus. The scientists designed an instrument which will remove the tissue without operating and without injuring the animal. Otherwise, the only way this tissue can be studied is by slaughtering the cow and then removing it.

Techniques for recovering live eggs from live "donor" cows are possible. However, researchers have found that some of the eggs will die. Ways to save all of them have not yet been perfected.

But important as these findings are, there are still many hurdles to pass before successful egg transfers can be accomplished.

One of the problems is in perfecting egg collection techniques. Another lies in the fact that a "recipient" cow at transfer time would need to be in the same stage of the estrous cycle as the donor cow when the eggs are collected. This means scientists must either find ways to "synchronize" the estrous cycles of the two cows, or they must develop methods for keeping the eggs live during storage.

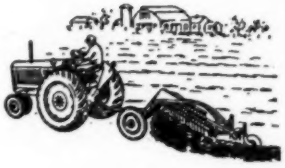
If ever perfected, the transfer technique will have two important results, say the scientists. First, it will mean more calves from genetically-better cows. Second, it will be an important research tool for studying causes of embryonic mortality (early abortions) in dairy cows.

Florida Likes Artificial Breeding

During 1957 the highest butterfat production record ever made by a cow in Florida was completed by an artificially-sired Jersey owned by T. G. Lee of Orlando. Her record for 12 months was 13,960 pounds of milk and 1,009 pounds of butterfat. She's the only cow ever to produce 1,000 pounds of fat on a year's test in the state.

Use of the best proved sires by means of artificial breeding along with good feeding and management, is rapidly improving the efficiency of Florida's dairy herds, authorities say. It is estimated that about 30 per cent of the dairy cows in the state are bred in this manner. —*Florida Extension Service*

What Does Hay Cost You?



Labor is the big item in haying costs, but new handling equipment saves time on large farms . . .

Condensed from Wallace's Farmer

EVER stopped to figure the cost of getting a ton of hay or grass silage under cover? Chances are the actual figures will surprise you.

Costs vary greatly from farm to farm. How many tons you put up with your haying equipment per year is a big factor.

Folks with just a few tons of hay to put up might well consider custom handling. Purdue University Economists figure you should handle at least 85 tons of hay and straw each year to justify owning a baler.

The minimum use figure for owning a chopper was 65 tons of field chopped hay or 210 tons of grass silage. Of course, a combination of uses for a chopper will change the picture somewhat.

Hiring custom work has drawbacks. You often won't be able to put up your hay just when you want to. And the custom operator will probably want to process all the hay at one time. So hauling and storage problems may arise.

Costs for producing forage are about the same per ton for all haying methods. The Purdue workers figure this cost at about $4 per ton.

Harvesting costs per ton stack up about like this:

Mowing	**$0.60**
Mowing and crushing	**1.50**
Baling—pickup baler with engine	**2.50**
Hauling and storing bales	**1.50**
Chopping and placing in mow	**4.75**
Barn drying	**3.25**

From these averages of actual costs on midwestern farms you can figure your haying costs.

If you make your hay into grass silage, raking and windrowing may be eliminated if the chopper is designed for direct cut. This increases chopping costs slightly, though. Capacity is less than for windrowed material.

Costs of grass silage storage

Reprinted by permission from Wallace's Farmer, Des Moines, Iowa

vary greatly with the type of storage. Upright storage may cost up to $3.50 per ton for storage alone. Surface silos cost less per ton for storage. But spoilage is greater.

The dairy cow is the most efficient animal producer of calcium. The cow produces 10 times as much as the hen, its nearest competitor in terms of converting calcium intake to calcium produced.

Figured on the basis of hay equivalent—since much of grass silage tonnage is water—costs for harvesting and storing range from about $5 to nearly $8 per ton.

One point to keep in mind is feeding costs. Extra storage costs may mean lower feeding costs.

Labor costs have been included in these figures. But the amount of labor for each method may be important if labor is not readily available.

Michigan State College researchers found that about 1.7 hours were needed to move one ton of hay as grass silage from windrow to storage. Chopped hay required about 1.6 man-hours per ton. Baling time averaged out 2.2 hours per ton.

Use of labor saving handling equipment makes a big difference here. The folks in the Michigan study using the most efficient handling methods took only 1.2 man hours per ton of baled hay.

Average investment generally runs a little less for the baler operations. The Indiana study showed a $2,616 average investment by farmers baling their hay. Capital tied up in chopper outfits averaged $3,426.

Frozen Semen Good After Two Years Storage

It has become possible to increase the service life of outstanding bulls by at least two years, since frozen semen from these sires can be used to produce calves artificially nearly 2 years after the sire has died or been removed from service.

Scientists at Rutgers University report that semen may be stored for at least two years at minus 110° fahrenheit without causing an appreciable decline in the fertilizing capacity of that semen. In New Jersey the frozen semen from 5 bulls was used to breed 102 first services. The fertility rate of the semen used fresh and after storage from 7 to 14 days, 6 months, 1 year, and 2 years, was 78.0, 66.7, 70.1, 65.7, and 65.7% respectively.

—Rutgers University

When to Breed the "Problem Cow"

Results of a study on irregular heat periods and their effect on conception rates . . .

Condensed from Holstein-Friesian World

R. E. Erb, State College of Washington

THE normally functioning unbred cow should come in heat at approximately three-week intervals. The most frequently observed length is 21 days, though heifers may be one or two days less, and cows over 10-12 years of age may be one or two days more.

Though we expect heat periods at 21-day intervals, only about 15 per cent come into heat at exactly 21 days. Among unbred cows we can except 60-75 per cent of the heats to occur within 18-25 days. Among the remaining 25-40 per cent, nearly 10 per cent may be shorter than 17 days.

The number of irregular cycles is even higher for cows returning in heat after being bred at the previous heat period. Generally less than 5 per cent of these are shorter than 17 days, and correspondingly more are over 25 days in length. This latter occurrence is of considerable economic importance because the time of next calving is delayed and may result in longer than necessary dry periods.

It is frequently recommended that cows not be serviced following estrous cycles of irregular length. This generally means cycles occurring outside an interval of 18-25 days. In most herds this involves around 40 per cent of the cycles. Under these circumstances it is important to know how much the conception rate is lowered when cows are serviced at the end of an irregular estrous cycle. Economically speaking, what system of breeding management will result in the greatest number of conceptions in the shortest period of time?

Records Used for this Study

Twenty-five years of breeding records from the Carnation Milk Farms Holstein herd were used. There were 19,369 services following estrous cycles of known lengths. The records were gathered and maintained by a single

Reprinted by permission from Holstein-Frieson World, Lacona, New York. Material originally from The Purebred Dairy Cattle Association Research Committee, Box 150, Peterborough, N. H.

herdsman (Henry Duve) and extended from 1926-50.

Veterinary clinical records were kept by the veterinarians employed full-time by the farm. Methods of housing and general management were quite constant. Conditions for observation of heat were considerably above average because all cows were easily observed whether on pasture, in box stalls, or in exercise pens. Some cows were milked four times daily and all others were milked three times which further reduced the time cows were not observed during darkness.

Method of Analysis

Moeller and VanDemark (Illinois), Olds and Seath (Kentucky), and Flerchinger and Erb (Washington) analyzed thousands of artificial breeding association records to determine the nonreturn rates among cows returning for a second service at varying periods of time after the first service. These workers found that cows returning for service within 2-17 days after a previous breeding had a considerably lower conception rate at the repeat breeding.

If repeat service was 18-25 days or longer after the previous breeding, the nonreturn rates were higher. In fact, those cows repeating 50 or more days after the previous service had higher nonreturns at the repeat service than those coming back at the expected time of 18-25 days.

It is not possible to fully interpret artificial breeding association records because: 1) the length of the estrous cycles can be determined only from one breeding to the next and in some cases the cow may have come in heat and the inseminator was not called until the next heat; 2) nonreturn rates are on the average 5 per cent higher than actual conception rates and this difference becomes greater as the repeat service interval becomes longer since some cows would be beefed instead of again being rebred; 3) the comparison can be made only with cows which failed to conceive on the first service which means a higher than average percentage of abnormal cows are involved; and 4) condition of the genital tracts are unknown.

In the present study it was possible to divide the estrous cycles into four categories. First, each breeding period of each cow was classified as normal or abnormal. A breeding period was classified abnormal if at any time genital tract infections, including discolored mucus, were observed or if other cervical, uterine, or ovarian abnormalties were found during clinical examination.

Events at the calving which started a new breeding period were not considered nor was the

occurrence of irregular estrous cycles used to classify a breeding period as abnormal. Therefore, the breeding periods classified as normal were those not observed with abnormal genital tracts.

The normal and abnormal groupings were each subdivided according to whether the cow was also bred or not bred at the previous estrus. *If the cow was not also bred at the preceding estrus, the cycle was classified as a nonservice cycle. If the cow was bred at the preceding estrus, the cycle was classified as a service cycle.* This latter grouping is important because we know that a considerable number of fertilizations fail very early (early embryonic mortality) and that this causes delayed estrus and pathogenic complications.

Results of this Study

The reason for classifying the estrous cycles into four groups is quite evident. Normal cows not bred at the previous estrus (nonservice cycles) had a conception rate of 50 per cent, or two services per calf. Normal cows which were also bred at the previous estrous (service cycles) averaged 40 per cent. This latter group has lower conception rates because they are in reality repeat breeder cows. In contrast, the abnormal cows averaged only 29 per cent when not bred at the previous estrus and 21 per cent when also bred at the previous estrus.

The conception rates for this analysis were lower than those generally seen because services to cows later determined sterile were included. Also many cows were bred and conceived at the first estrus after calving and these do not appear in this summary. This occurred though only a few cows were bred sooner than 60 days after calving. Undoubtedly many of these cows had one or more "silent heats" which, of course, could not be observed without an excessive number of rectal examinations.

Among breedings following normal nonservice cycles only the 2-16 day group was clearly below the group average of 50 per cent. The differences were greater for normal service cycles. The 2-16, 17-19, 20-22, 29-31, 32-34, and 35-37 day groupings were clearly below the average for this group. Most interesting is the fact that cows returning in heat and rebred 50 or more days after a previous breeding had a significantly higher conception rate as compared with those returning for service sooner than 50 days.

Dairymen can put this finding to good use by remembering that the chances for immediate conception are much better for cows returning for service after two or three months than those returning in less than one month.

The total time to the next calf may actually be less in a great many cases.

The two groupings of cycles for abnormal cows show trends similar to those for normal cows, though the conception rate is much lower. The seriousness of genital abnormalties cannot be overlooked. Even though it was not a practice at Carnation Farms to service cows not believed in condition for breeding, the conception rate was still very low among cows which had or developed genital abnormalities after calving or during the service period.

Summary

From the results of this and other studies there appears no practical reason for delaying service because of estrous cycle irregularity providing the cow is otherwise essentially normal.

One might consider delaying service following cycles of 16 days or less since little time would be lost in waiting for the next cycle. Such cows may be temporarily cystic and require prompt treatment to avoid permanent development of the condition. Abnormal cows repeating for service any time within 37 days might profitably be withheld from service (19-22 days a possible exception) because the chances for conception were over one-third greater for abnormal service cycles exceeding 43 days.

Normal or abnormal cows repeating for service more than 50 days after a previous service are more likely to conceive immediately than those repeating for service sooner. This fact should be carefully considered when deciding whether or not to cull such cows.

Swine In Early Virginia

Hogs swarm like Vermine upon the Earth and are often accounted such, insomuch that when an Inventory of any considerable Man's Estate is taken by the Executors, the Hogs are left out, and not listed in the Appraisement. The Hogs run where they list, and find their own Support in the Woods, without any Care of the Owner; and in many Plantations it is well, if the Proprietor can find and catch the Pigs, or any part of a Farrow, when they are young, to mark them; for if there be any market in a Gang of Hogs, they determine the Property of the rest, because they seldom miss their Gangs; but as they are bred in Company, so they continue to the End. (1705)

Robert Beverley, *The History and Present State of Virginia*

Hardware and Calving

"Extra effort to expel foetus may cause a foreign body to penetrate the wall of the second stomach."

Condensed from The Agricultural Gazette of New South Wales

Division of Animal Husbandry,
New South Wales Dept. of Agriculture

FEEDING for production is not without risk, especially if purchased roughages are used. One of the big dangers is the presence of small pieces of wire, nails, or other foreign bodies which are quite readily swallowed by cattle. Even if cattle are not being hand-fed, they frequently chew material of this nature, particularly if there is some deficiency in their mineral intake. In these circumstances, the condition may be seen in quite good seasons.

When cattle swallow wire it is usually deposited in the second stomach and may lie there for several months without doing any appreciable damage. During calving, the extra effort needed to expel the foetus may cause a foreign body to penetrate the wall of the second stomach and enter other organs in the body. When it does, it takes with it infection from the bowel. While these organisms do not cause any ill-effects in the bowel, when they are let loose through the wound, they result in serious damage, depending on the location and extent of the infection and injury produced. A case of this nature may show itself by the animal having an "attack" within a week or two after calving.

When the foreign body first pierces the wall of the second stomach, it usually passes through the diaphram into the chest cavity. At this stage, the animal becomes very ill and is evidently in much pain. If the infection is overcome and the foreign body does not pierce the heart or the heart sac, the animal will recover, at least for the time being. If the heart or the heart sac are

Reprinted by permission from The Agricultural Gazette of New South Wales, Farrer Place, Sydney, New South Wales

pierced, death usually follows immediately.

Other symptoms caused by penetrating foreign bodies are related to the organs damaged. For instance, if the heart action is interfered with, there may be swellings of the neck, around the legs, and in the lower portions of the body.

In some parts of China, pieces of hard cheese are still used for money.

Any intestinal disorder accompanied by pain, especially over the lower chest and abdomen, and particularly if associated with calving a short time previously, should be regarded with suspicion.

Treatment of the condition is somewhat unsatisfactory, and is definitely beyond the farmer. It needs skilled professional treatment and advice, which even then is not always successful. The only way the farmer can attack the problem is to prevent it occurring. Attention should be paid to the diet, so that the mineral intake is sufficient. Great care should be taken to prevent foreign bodies such as nails and pieces of wire gaining access to the food. If the disease is suspected, you should contact your veterinary practitioner for advice.

Twenty Per Cent Food Dollar in 1957 Spent on Dairy Products

The average person in the United States in 1957 consumed milk and other dairy products which utilized 695 pounds of milk. The average consumer bought 142 quarts of fluid milk, which headed the list of individual purchases. Cream was second at 43 pints (milk equivalent) and butter was third with 8.4 pounds.

Per capita consumption of other dairy foods was 7.8 pounds of cheese; 15.1 pounds of evaporated and condensed milk; 5.7 pounds of nonfat dry milk; 19.8 quarts of ice cream and other frozen dairy products; 5.2 pounds of cottage cheese; 5.4 quarts of fluid nonfat milk; 16.4 quarts of buttermilk; and 4.1 quarts of chocolate milk.

Twenty cents out of each food dollar, or 20 per cent of the food budget, was spent for the above-listed foods.

—Texas A & M College

Handy Moisture Test for Silage

You don't need expensive equipment . . .

Condensed from The Kentucky Farmer

A SIMPLE procedure called "the grab test" provides farmers with an effective way of checking the moisture condition of crops for silage.

Use this test to show the condition of crops standing in the field, lying in the swath or windrow, or chopped in the wagon. The procedure is to squeeze tightly, with all your strength, for 90 seconds a handful of fine-cut crop. Release the grip and note the condition of the ball of crop in your hand. The condition of this ball indicates the kind of treatment the crop must receive to make good silage.

Four stages of moisture are illustrated and described below with recommendations for ensiling.

1. If juice runs freely or shows between the fingers, the crop contains 75 to 85 per cent moisture and is too wet to make high quality silage without treatment. Silages made from crops in this condition will lose large quantities of juice. When possible, wilt these crops; if they must be ensiled without wilting, use a chemical preservative or 200 pounds of ground grain per ton of crop.

2. If the ball holds its shape — the hand is moist, the crop contains 50 to 75 per cent moisture. Some juices will escape from tow-

Reprinted by permission from The Kentucky Farmer, Box 210 Middletown, Kentucky

er silos. Additional wilting in the field is desirable. Where this is not done, use a chemical preservative or 150 pounds of ground grain per ton of crop, or layer with wilted crops. Odors will be strong without some treatment.

3. If the ball expands slowly—dampness appears on the hand,

the crop contains 60 to 70 per cent moisture. This is the best condition for ensiling legumes without treatment. Treat grasses with a chemical preservative.

4. If the ball springs out in the opening hand, the crop contains less than 60 per cent moisture. Only very young crops wilted to this condition can be safely ensiled. Others are likely to mold in the silo unless layered with wet crops.

Cost of Gain Key to Beef Profits

Cattle feeders are going to have to squeeze production costs if they hope to make much of a profit this coming season. The key to a profitable operation will be very cheap gains, according to Bill Finley, Michigan State University extension beef specialist.

To keep cost of gain down, Finley recommends farmers use poor quality feeds first and then improve the ration as cattle get close to market weight. Roughage should make up the bulk of the ration. And where silage, especially corn, is available it should be used. You can also use oats first and then switch to corn later.

For each 100 pounds of live weight of steers on full feed, feed about two pounds of grain, four to five pounds of silage and about a half pound of hay per day. Complete the ration with one to two pounds of protein supplement per head per day. Plenty of clean fresh water, a dry bed and freedom from external parasites will also help keep the cost of gain down.

—Michigan State University

The Dairyman's Dilemma

Mastitis is a herd problem. It's important to avoid "stresses" . . .

Condensed from Science for The Farmer

MASTITIS or udder inflammation is the most expensive disease affecting dairy cattle. U. S. dairy farmers pick up the check for production losses amounting to $225,000,000 annually. Records show that from 10 to 15 per cent of the cows in DHIA herds are eliminated every year as a result of this disease.

The best weapon we have against mastitis is the resistance of the cow to the organisms that can produce the disease. Any measures in management which improve the well-being of the animal directly affect resistance to mastitis. Cow comfort pays off. Ample stall room, sufficient bedding and good ventilation are particularly important in the winter time. Drafts and chilling from insufficient bedding directly affect disease resistance.

Drugs Not Cure-All

With the advent of sulfonamide drugs, antibiotics, and the cortico-steroid drug, treatment has been vastly improved. Fifteen years ago some investigators went so far as to say the new drugs would eliminate mastitis. This, we know, has not been the case. We now have more mastitis cases than ever.

Select Breeding Stock Carefully

Inheritance plays an important part in the mastitis picture. Well-attached, balanced udders are much less susceptible to injury than are pendulous or long-teated udders.

Rugged character, scale and strength are inherited characteristics which affect resistance to all diseases. Stresses play an important part in their effect upon disease resistance. Milk production as it increases in volume is a constant stress proportionate to the output of each cow. A low producing herd can endure much more mismanagement than a high producing herd.

Avoid Stresses

Sudden changes in feeding, temperature, or daily routine often create sufficient stress to

Reprinted from Science for the Farmer, Pennsylvania State University, University Park, Pa.

cause mastitis outbreaks. Research work has discounted the effect of the amount of protein or other nutrients in feeds as a direct cause of mastitis. Nervous stresses such as commotion at milking, and rough handling must be eliminated. The dairy cow is happier and healthier when her life is most tranquil.

Avoid Udder Injuries

Injuries to the udder are equally important to stresses as a cause of mastitis. Teat injuries from trash in yards and pastures, barbed wire and tramping should be avoided. Horns, boss cows, and cow dogs ruin many udders.

Handle Milking Carefully

No machine is any better than the man using it. If you have to carry milk outside the barn, use one unit per man. Milkers should never be applied without proper preparation to stimulate milk letdown. Correct vacuum level, the right pulsation rate, and clean vacuum lines eliminate important sources for injury. Complete milking of all of the quarters as quickly as possible has been shown to be necessary to udder health. Machine strip, but remember that the machine does the most damage if it is left on too long.

Sanitation Essential

Management of heifer calves, dry cows, and freshening cows directly affects udder health and disease resistance. Dairy barn sanitation and milking sanitation are important for their favorable effect on resistance to all disease, not to mention the obvious reasons why cleanliness is so important in production of our most perfect food.

Use Medication Carefully

Elaborate milk-sampling procedures and mastitis control laboratories have been set up in several states in an effort to rid dairy herds of mastitis organisms. The only hitch in that approach is that other organisms take over when one species is eliminated. Mastitis cases caused by some of these less dominant bacteria are usually more severe and much more difficult to treat. This can be attested by the fact that farm magazines today carry advertisements announcing a fantastic array of antibiotics, sulfonamides, cortico-steroids — even enzymes and cobalt additives for udder infusion. Very little good and much harm can result from efforts to sterilize udders of bacteria.

Trust Your Veterinarian

Farmers should rely on the advice of their veterinarian for *prevention* and *control* of mastitis. Veterinarians are well qualified to do this, but most often they are asked to treat individual cases once it has broken out. Mastitis is a herd problem.

Making Money With a Dairy Herd

Good management is the most important single factor. Use these figures to check your herd . . .

Condensed from
Farm Management Letter No. 167

A. G. Mueller, Agricultural Economist

RECORDS of dairymen in the Illinois farm management association show a wide range in returns per $100 feed fed to dairy cattle. Differences in herd management are believed to be the important reason for the differences in returns. Their farm records and cost accounting work point to some important areas where good management has paid off.

Feed makes up about 50 per cent of the total cost of maintaining a dairy herd. Labor, 20 to 25 per cent; and all other capital costs, 25 to 30 per cent. A typical dairy herd raising replacement cows has about as many calves and heifers as producing cows.

From 15 to 20 per cent of total dollar sales from a dairy herd are vealers, young stock, and cull cows.

The Illinois farm records show that average milk production per cow went up from 8,240 pounds in 1951-52 to 9,494 pounds in 1957. Size of herd has increased about one cow per year in the past four years. Herds with ten or more cows now average 24.8 milk cows.

A dairy expert says a happy, contented cow will smile by cocking her ears forward and brightening her eyes.

Good management separates the profitable dairy herds from the low-profit herds. For the past nine years, the high one-third of the herds have averaged $211 returns per $100 feed, and the low one-third have averaged $128.

Important management decisions concern the following areas:

1. *Milk production per cow* was an important difference between the high and low groups. Herds with high returns averaged

Reprinted from Illinois Farm Management Letter No. 167, University of Illinois, Urbana, Illinois

9,282 pounds of milk per cow, while low-return herds averaged 7,877 pounds. Butterfat test averaged 3.8 per cent for both groups. In dollars, the additional 1,405 pounds of milk amounted to $54 per cow.

2. *Feed cost per cow* was $210 compared with $257 for the low herds, a saving of $47 per cow. A smaller number of replacement cattle in the herd and more feed nutrients from roughage explain part of the lower feed cost for the high herds. But the amount of feed charged to the dairy herd is apparently the big reason for the difference in feed costs. Quality of roughage may be a factor here.

3. *Price received for 100 lbs. of milk* was $3.84 for the high group and $3.55 for the low group, a difference of $23 per milk cow. These prices are net on the farm. Our farm records do not show the reasons for this difference, but transportation costs, seasonality of production, and Grade A markets are frequently cited as factors that explain the difference.

These three differences between the high and low dairy herds can be measured by farm records. Management decisions in use of labor and equipment and other capital costs are equally important in determining profits from dairy herds, but our farm records do not make it possible for us to put dollar values on these other differences.

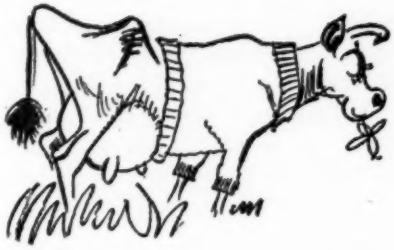
Dairymen Fight Metal With Metal

"Fight metal with metal" is the result of the dairymen's efforts to combat "hardware" disease. This illness is just what the name implies. Many of our dairy animals are suffering from metal objects which they pick up with their feed.

Naturally, dairymen are doing their best to prevent this hardware from getting into the paths of hungry mouths, but despite their efforts, as high as 70 per cent of our dairy animals have consumed some hardware.

The weapon now being tried is a small magnet which is injected into the cow's stomach with a regular balling gun of small diameter. A number of different types of magnets are being used, but evidence points to better results with the use of a magnet about three inches long and one-half inch in diameter. This magnet seems to hold the hardware so that the ends are not as likely to puncture the vital organs. The magnet must not be too heavy or it will cause irritation to the stomach lining. *New Mexico A & M College*

The Philosophy of Stock Farming



When man began to keep livestock under artificial conditions, he raised some problems . . .

Condensed from
Farming in South Africa

Professor J. C. Bonsma

THE culture of a people has a profound effect on the type of animal kept, as well as on the purpose for which it is kept..

For example, we find that very superstitious people contribute virtually nothing to a productive animal husbandry, simply because they do not apply selection for increased productivity.

Man has dominion over the animal and by means of selection he can guide its development in different directions. Man's power, however, is limited, and the effect of certain environmental factors must be considered when the type of farming in general, and the type of animal in particular, is decided upon.

Man began to keep animals under artificial conditions and, in doing so, eventually forced them to extremes in certain avenues of production. Management by man has therefore become essential to ensure the survival of highly specialized animals.

Feeding, together with metabolism, is the most important factor.

Temperature, also has a great influence on the animal. For example, it has been found that, if European cattle breeds are exposed to very high temperatures, the hypophysis is damaged with the result that their growth and reproductive capacity are affected adversely. Cattle with a short, glossy hair-covering are better adapted to tropical and subtropical conditions than cattle with long, woolly hair. Exposure to the sun's rays may cause hyperkeratosis of the skin in animals with unpigmented skins. A short, glossy hair covering is therefore essential where animals are often exposed to the sun.

Changes in the length of daylight stimulate the shedding of hair. Early shedding of hair indicates a sound nutritional con-

Reprinted by permission from Farming in South Africa, Dept. of Agriculture, Pretoria, So. Africa

dition and an active endocrine system. Animals which shed their hair early in the year should be good producers.

A recent survey showed that 94% of girls age 11 thru 18 years planned to marry, but only 3% of them planned to be home-makers.

On account of the low concentration of oxygen at high altitudes, animals there tend to have a relatively high red corpuscle count, which enables them to absorb oxygen more rapidly.

It has been found that animals kept at a high nutritional level are more resistant to internal parasites than animals at a low nutritional level, even if the latter are treated with worm-killers. This, of course, does not mean that it is wrong to use the remedies which science has made available or that they are ineffective, but merely that there are other important methods of combating disease.

Observations have shown that cattle in areas where the rainfall and humidity are high, are relatively small with a large skin surface.

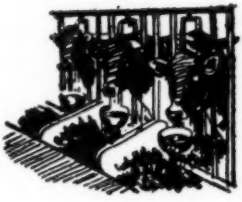
The fertility and acidity (pH) of the soil affect the vegetation and, since ruminants depend on the vegetation for their food, these factors also affect the animals. Thus for example, we find that in high-rainfall areas the soil, and consequently the plant contains little calcium. The animals in such areas are usually relatively small because there are insufficient minerals for the development of a large carcass.

There were 7,800 bills introduced in the House of Representatives during the last session of Congress. That means a Congressman would have to read 21 bills each day to keep up. Of 10,556 bills introduced in the House and Senate, only 390 actually passed.

It should be stressed that these environmental factors are not unrelated, in fact, there is a definite interrelation between them. In nature these factors influence one another and eventually effect a balance. The animal we wish to keep in a specific environment must be adapted to this balance of factors.

To ensure high production we must therefore select for adaptability and the factors which affect adaptability. In the case of beef farming in the subtropics for instance, it is essential to select for adaptability, short glossy hair, a thick skin, early shedding of hair, rapid growth, effective feed utilization and fertility.

A Plug for the Small Herd



Someone predicted economic doom for the small dairyman. Too many other people are parroting his opinion without looking into the facts . . .

Condensed from The A. I. Digest

H. A. Herman, Secretary of the National Association of Artificial Breeders

WE are getting a bit disgusted by the steady clamor of some farm editors, extension workers, and equipment companies that proclaims nothing but economic doom for "the little guy" in dairying.

We don't believe size is the final answer. Someone "started this record playing" and it looks as if too many people are parroting it without looking into the facts.

Sure a large operation can have advantages in milk per man hour, per dollar invested in equipment, and if the business succeeds it probably can produce milk more cheaply per hundred weight than some smaller dairies. Some don't however!

Size isn't everything in a dairy operation. *It is mostly the size of the dairyman in his ability to control income and expenditures that gets the job done.* About 77 per cent of our dairy herds in America are 10 cows or less. Certainly many small operators are worried about the cost of a bulk tank, walk-in milking parlors, and changes that have to be made to stay in line with "milk pick-up" programs. Some small operators are folding up—so are some of the large outfits because they can't make a reasonable return on the investment.

When dynamite explodes, the powder or liquid changes into gaseous form and occupies 8,000 to 10,000 times the space it previously did.

We know many dairymen on 80 to 160 acres that have 10 to 25 good cows averaging 10,000 pounds a year on 2X milking. They have 3 to 5 "kids," a good wife and a couple of good hounds. They are living and owe no one enough to worry about. Many have bulk tanks and fully electrified farms. They are fully utilizing their "cow sense" and

Reprinted by permission from The A. I. Digest, Columbia, Missouri

native ability as farm managers. Most of their land is productive and top quality roughage is the basis of their feeding programs.

We believe dairymen of this kind — many who are purebred breeders and can claim an extra dividend on a registered calf or cow sold—will be around for a long time. They are still the backbone of the dairy business.

Efficient Cows — Good Management

We firmly believe the future of a sound and stabilized dairy program in America depends upon cows that can make 10,000 pounds or more milk a year on two time milking.

Here's where improved breeding comes in. It is also where the artificial breeding program plays a big part. It makes no difference if a man milks 20 cows or 100 cows they must be efficient producers. The more poor producing cows a man milks—be he a "big" or a "little" dairyman—the quicker he goes broke. We see this happen every day.

Proper feeding and management are a "must" in any dairy operation. This was never so important as now when labor, equipment, taxes, feed and other costs are high and the market is highly competitive.

Because a fellow has a small operation he doesn't need to quit dairying—but unless he has good producing cows and good management he'll eliminate himself via the starvation route.

Hay Crushers for Better Hay

The hay crusher is the best machine in sight for better haymaking, says Orrin Berge, farm engineer at the University of Wis.

Berge says crushers can shorten drying time by 30 to 50 per cent. In practice that means cutting one day to put up the next — or under favorable conditions cutting and finishing the same day. The result — less chance of rain damage.

Crushers save leaves, because stems dry faster. In a good many cases without crushing, the leaves dry up and become brittle before stems are dry. Some farmers, says Berge, feel that crushers make hay more palatable to cows by making stems softer.

Crush hay within 20 or 30 minutes of cutting. The crop begins to wilt shortly after mowing and then it's harder to get the crushed effect. Drive at a reasonable speed that does not overload the rolls, but not so slow that the rolls are pulling in the hay faster than the forward travel. —*Wisconsin Extension*

How Raven Set a New All-Time Record

A Brown Swiss cow recently broke the world's record for butterfat production with 1,579 pounds of fat . . .

Condensed from
New Jersey Farm and Garden

Frank A. Wright

WHEN she recently broke the world butterfat production record for all breeds with a total output of 1,579.28 pounds fat, Lee's Hill Keeper's Raven, a Brown Swiss owned and bred by Mr. and Mrs. Warren Kinney, of Lee's Hill Farm, New Vernon, New Jersey, also became the breed champion for milk production with a record 34,859 pounds. Here's how she did it.

Lee's Hill Keeper's Raven freshened on March 31, 1957, at nine years and nine months and started on test April 9. After having two attacks of milk fever, she milked 87 pounds milk on her ninth day. On her first official test day in April, her production was 107 pounds. The top day's production during the test was 121.5 pounds milk.

During June, she was stricken with forage poisoning while on pasture with the regular test cows. At this point, her production dropped to 66 pounds of milk a day, and it took her about three months to come back to a production of 100 pounds per day.

On the last day of her record, Raven produced 90.9 pounds milk. This compared with an average daily production of 95.4 pounds milk for the 365-day period, showing her consistent production ability.

Farm ownership is at an all-time high and only one out of three farms now has a mortgage.

Raven was milked and fed for the first month of her record by Robert Baylor, while Carl Stookey, who completed the record was in the hospital. At the time Stookey took over, Raven was milking 110 pounds of milk a day. During her attack of forage poisoning, she was under the care of Dr. John Hamilton, of Clifton, New Jersey. His contribution in Raven's treatment at

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, New Jersey

this time was of great importance.

Raven was kept in a box stall and milked by machine throughout her record year. However, she was turned out every day, rain or shine, for exercise—also to pasture, during the season, with the regular test cows.

Stookey says she was a good eater, always ready to take her feed. During her record period, she received all the hay she could consume, consisting of alfalfa, clover and mixed hay. Approximately 20 pounds of dried beet pulp soaked in molasses and water and 25 pounds of corn silage were fed, and a grain ration of 16% dairy feed was fed at an average of 25 pounds per day, with the top amount 32 pounds.

Eighth Generation

During the test year, Raven's record was supervised by representatives of the Office of Official Testing at the New Jersey College of Agriculture, under the direction of Dr. J. W. Bartlett. There were 24 official test days, which included 12 regular monthly tests, 7 automatic retests and 5 special check tests, one of which was of three-day duration.

The new champion represents the eighth generation of breeding by the Kinney family. Raven traces back to the cow Lola 2nd Registry, No. 668, purchased by Kinney's father in 1890 as part of the foundation herd at Kinnelon.

Woodlands pasture is poor fare for cattle. Studies in Illinois show that nearly 18 acres of woodland are needed in a normal year to maintain the body weight of a 700-pound steer during the pasturing season. A similar steer lost 75 pounds by July 20 on 12 acres of woodland pasture. Grasses under woodland shade have less carbohydrates and other nutrients than grasses in open pastures.

Raven was sired by The Keeper of Lee's Hill, a son of Jane 5th by The Keeper of Walhalla. Her dam, Royal's Rapture of Lee's Hill, was by Jane Royal of Vernon out of Marie of Lee's Hill. The nine-year-old dam of Raven, Royal's Rapture, has been one of the outstanding cow families at Lee's Hill. Her total production in seven years, nine months: 180,498.6 pounds milk —8,074.87 pounds fat. Her total average production per day: 67.2 pounds milk—3.02 pounds fat.

Mr. and Mrs. Kinney have contributed long and often to the improvement of the Brown Swiss breed. So has Manager Vernon C. Hull, who has so ably guided the development of Lee's Hill's herd. His foresight shows again in recognizing the abilities of this great cow and all of her family.

The Special Milk Program

Together with the National School Lunch Program, it makes still more low-cost milk available. Is your school on both programs?

Condensed from Agricultural Marketing

Walter Patterson

MORE milk is being made available to children in schools and child-care institutions. It will mean bigger sales for the dairy industry.

This is a result of the enactment of legislation extending the Special Milk Program for another three years.

During the fiscal year ending June 30, 1958, nearly 2 billion half-pints of milk were served to children in 75,000 schools of high-school grade and under and nonprofit child-care institutions such as settlement houses, summer camps, child-care centers, and similar institutions. This is in addition to milk served in schools under the National School Lunch Program.

Authorization under which the program had operated expired June 30, 1958. But the prompt enactment of the new legislation means that the program now continues without interruption. This makes it possible for schools to make firm plans for their fall sessions.

The Special Milk Program encourages increased consumption of fluid milk through a system of reimbursement or incentive payments. These payments enable schools to expand their current service by offering milk at reduced prices or by establishing new times for milk service.

Availability of milk is a key factor in the success of the program. Dairymen can work with schools and institutions in planning delivery schedules, and in helping them to overcome any other problems they may have in establishing or expanding a milk service to children.

Schools participating in the National School Lunch Program may receive reimbursement up to a maximum of 4 cents per half pint of milk served. But reimbursement is not made for the half pint of milk regularly served with the school lunch.

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For other schools, the maximum rate of reimbursement for milk sold to children is 3 cents per half pint. The actual rate of reimbursement depends on the cost of milk to the school, the proposed selling price, and the cost of handling milk within the school. Institutions and schools are permitted to use up to 1 cent of this reimbursement to defray handling costs. But, they must make maximum use of reimbursement to reduce the price of milk.

The program recently was improved and simplified for schools and child-care institutions where milk is not served as a separately priced item but is included along with other food and services provided for a set fee.

Schools and child-care institutions operating in this way submit a plan showing the specific methods and practices by which they intend to increase milk consumption. After the plan is approved and put into effect, schools and child-care institutions participating are reimbursed 2 cents per half pint on all milk served.

Nationally, this Special Milk Program is administered by USDA. In all States, this program is administered in public schools by the State's educational agency. In a number of States, some other agency of the State government handles the program in eligible institutions other than schools. In other States, however, Agricultural Marketing Service deals directly with nonprofit private schools and institutions.

Multiple Farrowing Increases Brood Sow Efficiency

Farrowing smaller groups of sows more often may increase brood sow efficiency, says H. G. Russell, University of Illinois livestock extension specialist.

Summarized 1957 Illinois Swine Herd Improvement Association records, revealed that sows farrowed in groups of 5 to 20 weaned 1.7 more pigs averaging 12.4 pounds more at 56 days than sows farrowed in groups of 20 or more.

The ten top producing small herds farrowed 10.5 live pigs per litter and weaned 9.6 at 56 days while the larger groups farrowed 9.2 sows and weaned 7.9 pigs.

Pig weights and litter weights at 56 days averaged 45.7 pounds and 418 pounds respectively for smaller groups compared with 33.3 pounds and 264.6 pounds for groups of 20 or more.

Death losses from farrowing to weaning was 15.6 per cent in the smaller groups and 19.1 in the larger groups.

—Farm News

Pelleted Rations — Feed of the Future

Complete ration pellets, roughage pellets for ruminants and field pelleting machines for forage crops are coming . . .

Condensed from The Country Guide

Cliff Faulkner

OLDTIME moviegoers will remember a picture starring Stan Laurel and Oliver Hardy that depicted life in 1980. Some guests had been invited to a "turkey" dinner, and were seated around a platter which contained a few little pills or pellets—some black and some white. When a black one was placed on Stan's plate, he stared dejectedly at it a moment or two, then asked plaintively, "Can I have some of the white meat?"

We may be a long way from taking our meals in pellet form yet, but our livestock population has been exposed to it for some time. Things haven't quite reached the point where a single pellet will provide a meal for a steer or hog, but pellets containing even a complete roughage-concentrate ration for ruminants are well on the way.

Pellets can now be obtained in almost any shape desired, and with a size range from 3/32" to 5" in diameter. One of the latest wrinkles is to put up hay in a big round pellet or wafer which resembles a hockey puck made of shredded wheat.

Feed pelleting is a result of man's desire to improve on nature's pellet—the grain kernel. It was found that when certain supplements such as bone meal, various oil meals, or molasses were added to the regular hay-grain ration, poultry and livestock gained better. But feeding additives separately means extra time and labor, and mixes or mashes don't flow as readily in self-feeders as grain kernels do. The next logical step was to grind all these substances together and rebuild them under pressure into a man-made kernel.

The pelleting process generally involves the addition of water or steam to aid in the binding process. Pellets are then dried and cooled. Sometimes a binding agent, such as molasses, is employed, although this is seldom necessary because many common feed materails possess natural binding qualities. By the use of

Reprinted by permission from The Country Guide, Winnipeg 12, Manitoba, Canada

dies of various designs, pellets can be turned out as cylinders, cubes, rectangles, or even stars.

Most pelleting machines in use today are large, expensive commercial types, requiring skilled operation. But pellet mill firms are now in a race to produce a compact, on-the-farm machine at a price that will allow pelleted feeds to compete successfully with loose roughages, grain and meal. Out in California, Ken and Jim Stewart of Rio Vista, have developed a harvesting machine which can pick up a forage crop and pellet it right in the field. Because of the high costs involved, this mobile pelleter is a long way from being a commercial success as yet, but it *does* indicate the shape of things to come.

There are many advantages in pelleted rations, and some known disadvantages are already being resolved by use of new pelleting equipment and techniques. But a lot of study is still needed on questions such as the effects of the grinding, heating, steaming, and cooling of the pelleting process on nutritional values of various ingredients. For instance, it is known to partially gelatinize the starches in grains and help convert them to glucose, and to destroy certain toxic materials in some feedstuffs — both of which might account for reported feeding gains.

As Prof. H. D. Bruhn, University of Wisconsin, writes: "When man tampers with nature's way of doing things, he must investigate all possible ramifications—good or bad."

Dairy farming in 1968 will be characterized by larger and fewer herds, complete mechanization, and more specialization, believe farm management specialists.

One of the big advantages to pelleting is that it provides a balanced feed ration which is convenient and p l e a s a n t to handle. The material flows easily from bins, and moves smoothly through self-feeders. Pelleting also reduces feed bulk (especially in forage crops), which means a reduction in storage or bag costs. It cuts down on dustiness and wind losses, and also prevents wastage caused by animals or poultry sorting through the ingredients and rejecting the less palatable ones.

Pelleted feeds are said to be more palatable than loose feeds, and reduce feeding time because pelleting increases feed density. Most tests indicate more feed is consumed and faster gains registered when rations are fed in pelleted form. They are being used widely, with success, in the winter feeding of range cattle.

Results of feeding tests on swine at the Montana State College, Bozeman, show that pelleted rations, consisting chiefly of small grains and their by-products, reduce the amount of feed required for 100 lbs of gain, and also the time required for the pigs to reach market weight. A New Mexico Agricultural Experiment Station reports that lambs required less feed per unit of gain when fed on pellets.

Pink eye is a condition of cattle and sheep that is often very contagious and, if neglected, rapidly spreads through a herd. It is characterized by reddening and watering of one or both eyes followed by clouding of the cornea which progresses to ulceration and apparent rupture of the eyeball. Veterinary scientists say affected animals should be isolated in a darkened area. Professional help should usually be sought.

In 1955-56 the University of Illinois fed four lots of Hereford steer calves a mixture of timothy and alfalfa hay free choice—some of it pelleted and some of it loose. The lot receiving pelleted hay gained 206 lbs. per head over a 119-day feeding period as compared to 75 lbs. per head for those receiving long hay. In lamb feeding tests at the same university, 90 lbs. of pellets produced the same gain as 100 lbs. of meal.

Tests with dairy cattle haven't been quite as successful. Although dairy calves ate more hay and less calf starter when the former was pelleted, mature dairy cows gave milk of lower butterfat content when fed a completely (including pelleted forage) pelletized ration. However, this was found to be due to the fine grinding of the forage rather than to any effects of the pelleting process itself. Finely ground hay, in either meal or pellet form, passes from the rumen too quickly to allow digestive micro-organisms time to go to work. This reduces the production of some fatty acids, and leads to a lower fat content in the milk.

The fault has already been overcome with the introduction of large pellets, made of coarsely ground or chopped hay. Another feature in favor of the big, loosely constituted pellet is that grinding and pelleting costs for this type are much less than for finely ground forages. On the other hand, feeding unground material, such as chopped alfalfa, into a pelleter greatly reduces the output of the machine.

Pellet feeding of poultry has been standard practice for a long time, and most poultrymen recognize that birds do better on pellets. For one thing, they get more feed in a given period of time because of the density of pellets. Pellets also allow the use of higher-fiber, less costly rations. However, there is some evi-

dence that, because the faster consumption rate fills the birds quicker, they have more leisure to peck at one another—especially in the case of broilers where a minimum amount of space is allowed per bird. When feeding pellets under these conditions, it is best to debeak the birds.

"Pellets are exceptionally good for chickens or turkeys on the range," states Dr. J. R. Aitken, Central Experimental Farm, Ottawa, Canada, "because they can be thrown right on the ground. Comes a wet day, just omit a feed. Growth speed isn't so important in range birds."

There is some evidence that heat generated during the pelleting process can cause a breakdown of easily oxidizable materials such as vitamin A, and that the availability of other essential nutrients may also be affected. Pelleting has been said to reduce moisture content (even when steam or water is added), to increase the ether extract, and decrease crudefiber. Other reports indicate a lower carcass quality in swine, and a slightly less efficient use of feed in poultry when pelleted rations were used. For the most part, however, these have been isolated cases, and a good deal of work has yet to be done along these lines.

Some complaints from ranchers that pellets they are now receiving aren't hard enough should be easy to rectify at the feed plant, because pellets can be made as hard as desired. But it's also possible to get them too hard. At the Experimental Farm, Lacombe, Alta., Canada, it was found that pigs eating pellets contracted sore mouths, and therefore didn't eat (or gain) as much as those using the same feed in chopped form. Feeds with a low fat content form hard pellets—unfortunately, manufacturers haven't yet been successful in pelleting a feed with a high fat content.

The nutrients which make milk an excellent food for children are needed by adults also, though often not in such large quantities. Children should have a quart a day to meet their calcium requirements; adults need at least a pint.

What about the economic aspects of feeding pellets? In some feeding tests, increased gains registered haven't been enough to cover the costs of grinding and pelleting, in others, feeding pellets has meant bigger profits.

"Whether it pays to buy your feed in pellets or have it pelleted yourself, will depend on each individual case," says Dr. Frank Whiting at Canada's Lethbridge Experimental Farm. "I doubt if many farmers who feed their own grain find it pays to take it to a mill to be pelleted. Depending

on the area, this could cost as much as $5 per ton."

When considering the economics of feeding pellets, however, it is well to remember the big savings in labor and handling costs. Pellets handle like grain; they can be mechanically lifted to storage bins and fed out via gravity flow. The compactness of a pelleted ration increases your farm storage capacity four times, and decreases hauling costs if you buy your feed.

At the present time, about 35 per cent of all commercially prepared feed used in the United States is fed in pelleted form, and this figure is expected to show a steady increase in the years ahead. It would appear that the development of pelleted hay for cattle, and recent advances toward pelleted whole rations for sheep and swine, opens wide new vistas for the livestock feeding industry. For instance, one California grower gets his alfalfa back from the mill as pellets less than two hours after it is cut in the field, and, by cutting it green, he has no weather problems.

Latest on Sterile Milk

A quart of Wisconsin milk can be processed into a sterile concentrated product and shipped a thousand miles or so to sell for less than 20 cents in far off grocery stores, according to University of Wisconsin dairy researchers.

Processing cost figures just developed by James Riekens and L. C. Thomsen show that the concentrate would cost 14½ to 15½ cents per one-third quart as it left the processing plant. One-third quart is enough to mix with water into one quart of fresh-tasting whole milk.

Transportation to such areas as New Orleans would bring the cost up to 16 or 17 cents per can. To this would have to be added the grocer's profit margin.

The exact store price would depend on the cost of milk and the operating margins desired by the processor and grower. In their figuring, Riekens and Thomsen used a price of $3.98 per hundred for fresh milk — the average Chicago price three years ago.

Aside from raw milk, the biggest processing cost will be for containers, the researchers found. Tin cans needed for sterile concentrate cost almost 1½ cents each.

Potential profits with sterile concentrated milk processing compare well with profits from other types of milk handling, Riekens and Thomsen say. *—University of Wisconsin*

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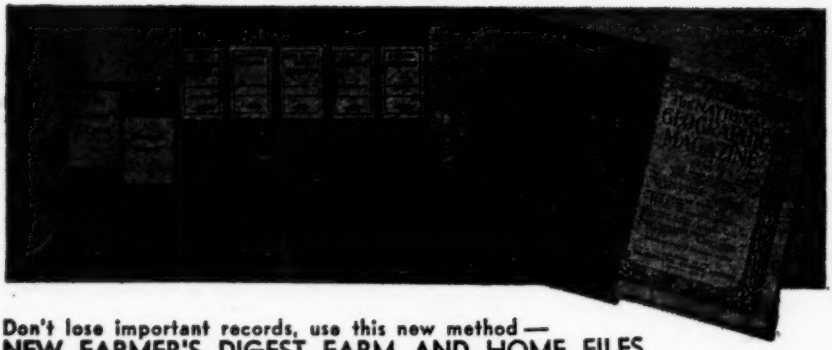

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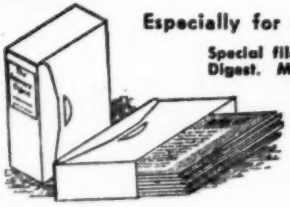

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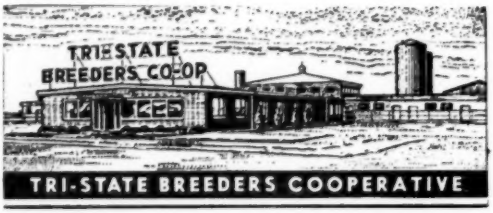

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